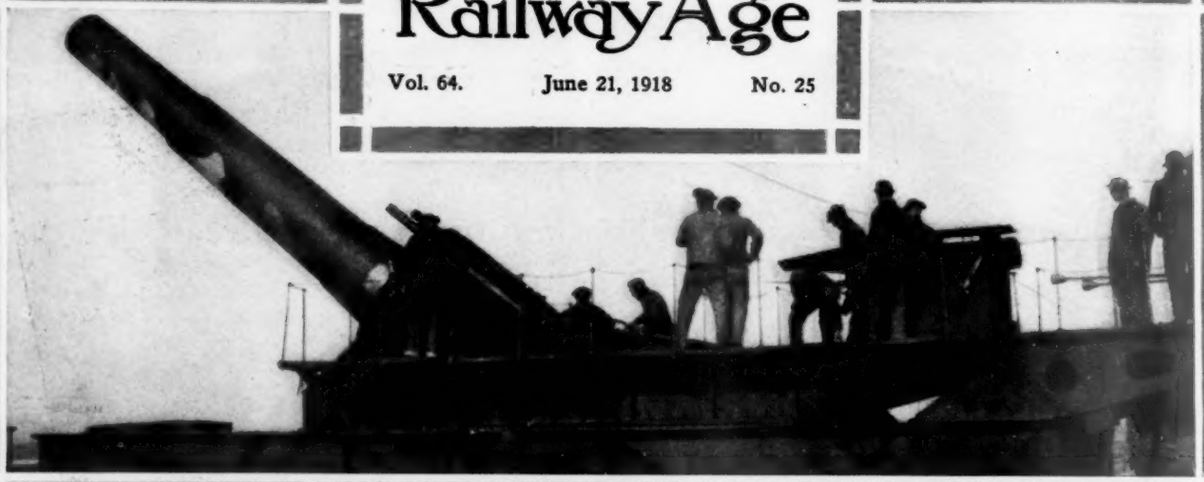
Railway Age

Vol. 64. June 21, 1918 No. 25



American Gunners Manning a French 400 MM. Railroad Gun.

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EDWARD A. SIMMONS, *Pres.* L. B. SHERMAN, *Vice-Pres.* HENRY LEE, *Vice-Pres. & Treas.* M. H. WIUM, *Secretary.*

CHICAGO: Transportation Building. **CLEVELAND:** Citizens Building. **WASHINGTON:** Home Life Building.

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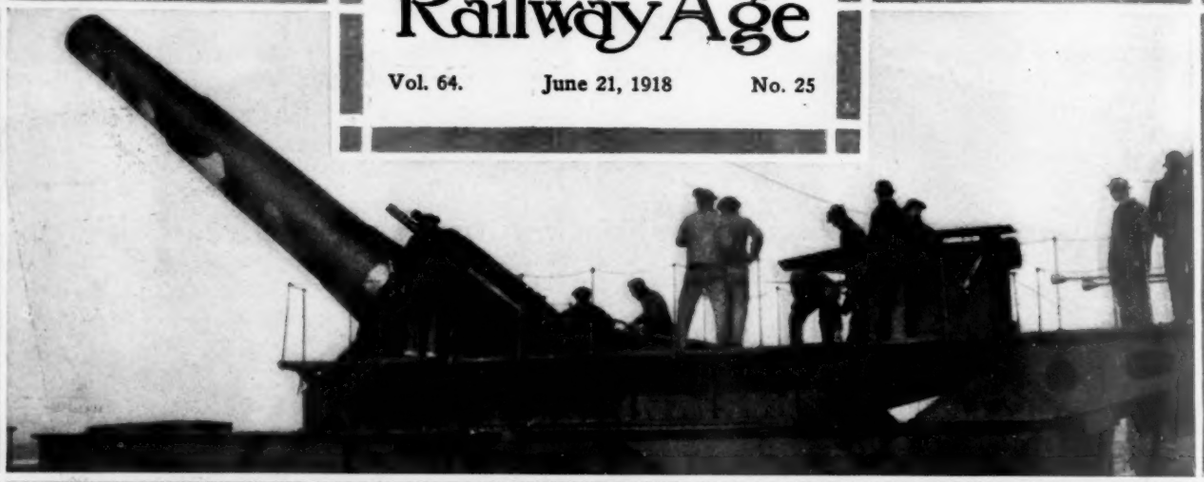

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Railway Age

Railway Earnings and Expenses

The reports of railway earnings and expenses gradually are growing better. Statistics for the first four months in 1918 show an increase in total earnings of $93,400,000; but owing to more largely increased expenses and taxes, a decline in net operating income of $98,100,000. Nor is this the whole story. When the retroactive advances in wages have been included the net operating income for these four months will really be reduced over $100,000,000 more, making the decline in operating income as compared with last year for these four months almost $200,000,000. But April makes a better showing than preceding months. With an increase of $45,000,000 in total revenues, there was a decline in net operating income of only $2,300,000. In the absence of the increase of wages, it might be said that conditions in April were approaching normal. But the advance in wages will convert a nominal loss of $2,300,000 in April into an actual loss of about $28,000,000. It is evident that steps toward largely advancing the rates were not made any too soon to save the Railroad Administration from incurring a huge deficit this year; and present indications are it will have some deficit in spite of the advance.

One Way to Get Work Done

The Railroad Administration has authorized the expenditure by the railroads during 1918 of nearly $450,000,000 for additions and betterments and in excess of $18,000,000 for extensions of branches and for new lines. The classified addition and betterment items include $98,661,000 for yard tracks and sidings; $61,979,000 for shop buildings, engine houses and auxiliary facilities; $47,471,000 for main tracks; $38,035,000 for bridges, trestles and culverts, and $31,556,000 for rails and other track materials. To obtain the full measure of value from this construction program the work must be completed before the difficulties of winter operation are encountered. To complete a program of this magnitude in the few months remaining before cold weather sets in is a large order that will tax the ingenuity of the roads to the limit. A considerable portion of this work must be done in localities remote from cities or other sources of labor, adding materially to the difficulties of the situation. Even under normal conditions it would be difficult to complete this program by the usual methods, and with the scarcity of labor and the great demand for contractors of ability to carry on essential government work, the problem becomes more complicated. Certain important eastern roads are meeting the situation by utilizing their own forces, detailing men from the engineering department to take entire charge of a project and holding them responsible for the completion of the work in a reasonable period. These men recruit their own organizations, place orders for materials and, in fact, perform practically all of the functions of a contractor. The roads profit by the plan, both by avoiding the necessity of paying a contractor's percentage and by the savings effected in accounting and inspection, while the engineers in charge have the advantage of utilizing men from other departments, when necessary, and railway equipment for the work without the necessity of detailed accounting to arrive at the distribution of expense. This plan has been followed on a number of roads for several years. It would appear to warrant further extension this year.

Freight Bill Order a Boon to Roads

The recent order of the Railroad Administration requiring the prompt payment of freight charges, will doubtless prove unpopular with shippers and likewise will meet with favor among railway officers. One of its effects is to force the public instead of the carrier, to wait for its money in case of errors in billing. Under former conditions credit was generally extended to consignees for a period of a week and, in the event of inaccuracies in the freight bills, until corrected bills were rendered. In the case of large firms, however, bills passed through so many departments that they were rarely settled within the time limit. It was not unusual for bills to be checked by the manufacturing plant receiving or forwarding the freight, by the traffic department of the industry, the accounting department and the treasury department before payment of freight charges was authorized. In addition, an assiduous search for errors in billing by both shippers and consignees really developed into an abuse in the case of many large firms, which deferred payment on freight bills in their entirety when one insignificant entry proved to be inaccurate.

There seem to be no records indicating the extent to which freight charges were settled under credit arrangements. Railroad officers familiar with the subject, however, estimate that considerably more than 50 per cent of all freight charges are settled through credit transactions. In view of this condition the losses in uncollectible freight charges are relatively small in relation to the operating revenues of the carriers. In the year ended December 31, 1916, uncollectible freight revenues for all the railroads in the United States amounted to $818,422, or 0.022 per cent of the total operating revenues of $3,691,065,217. Under the new order, however, even this small loss will be prevented.

The granting of credit is not absolutely prohibited under the new plan but is limited to 48 hours after shipment or delivery at destination, and is granted for that period only when a surety bond in an amount satisfactory to the treasurer of the carrier is filed. In a circular explaining the order, the Railroad Administration states that the new rule must be interpreted in a practical business way. If, for example, a consignee who is financially responsible is accustomed to send for his freight in the morning and the collection of the freight charge is effected in the afternoon, that arrangement will be treated as a cash transaction so long as the consignee continues to pay his freight bills promptly upon presentation. Similar application of the rule will be made in the collection of a prepaid charge from a shipper. Perhaps the greatest objection which shippers have raised to the new plan is that it gives them no opportunity to check bills for inaccuracies. The director general, however, promises prompt and fair settlement of overcharges and claims for loss and damage. Furthermore, he authorizes agents to make corrections in bills before exacting payment in cases wherein a mistake is obvious or it is plainly indicated upon the face of the bill.

As previously suggested, a distinct advantage of the new

plan is that it eliminates delay in the settlement of freight charges, thereby saving the carriers much time and expense as well as giving them the benefit of the interest which formerly accrued between the performance of service and the settlement therefor. From the standpoint of the various classes of shippers and consignees the order is likewise beneficial as it prevents discrimination. As the director general points out, the extension of credit in the payment of transportation charges to one person while it is denied to another results in a preference in favor of the person to whom credit is given.

Selling Mechanical Supplies Under Government Operation

THE CONDITIONS under which cars and locomotives and the specialties on them are sold under government operation of the railways are radically different from those under which they were sold when the railways were operated by the different companies.

Under private operation there was not only competition between the concerns selling the materials but also between the railway companies buying them. Each supply company had a large number of actual or prospective customers, and failure to get certain large prospective customers or the loss of some large customers a concern already had, while a matter of importance, was not a matter which was vital. Under government operation, on the other hand, the purchase of all equipment and of all specialties used on new equipment has been placed in the hands of a single committee, and therefore a supply concern's success or failure in negotiating with this committee is a matter of almost vital importance.

A list of the car and locomotive specialties bought by the Central Purchasing Committee to be used on the 1025 locomotives and 100,000 freight cars recently ordered by the Railroad Administration was published in the *Railway Age* for June 14, page 1448. A comparison of the distribution of orders shown by this list with the way in which orders for car and locomotive specialties have been distributed in the past sufficiently explains why the managers of some supply companies express great satisfaction with the way in which the Central Purchasing Committee has distributed the orders while others express only mild satisfaction, and others very great dissatisfaction. Some concerns which have had the largest business in their lines in the past have secured an even larger part of the total business in those lines than heretofore. Other concerns, some having large, some having small, parts of the total business in the past, have received about their usual proportions. Some concerns which have had very large parts of the business in their lines heretofore have received very small parts of the orders, or none at all. Some concerns which under the old conditions secured only a small part of the orders in their fields have under government operation secured the lion's share of the business.

It is very difficult after studying the list of orders to conclude that any particular principle governed in their distribution. In many instances it would appear that the factor of price was controlling, but in not a few cases it is evident that this was not the case. One of the notable consequences of the new method of buying is that it has resulted, in many branches of the railway supply field, in a reduction of the number of concerns which have succeeded in getting orders. A good many concerns which have done a large business in the railway supply field were given no business at all, or so little as to be equivalent to almost nothing. In other cases concerns which were just beginning to get a foothold were disappointed in receiving no orders. In still other cases, however, comparatively unknown concerns got a large amount of business, and likewise in some cases large orders were placed for comparatively unknown devices.

On the whole, we should say that the two most characteristic features of the centralized buying of car and locomotive specialties have been, first, to put relatively greater stress on prices and less on quality than was done when railways bought separately; and, second, to reduce the number of concerns from which purchases are made. We believe both these tendencies are largely due to the fact that under the present system the technical officers of the railways, who are the best judges of the goods, have less influence and a committee of purchasing officers more influence in determining the things that shall be bought than was the case under separate management of the various railways.

Obviously, both price and quality should be given due consideration, and if the former is given greater weight than the latter the effect will be to cause deterioration of the physical properties of the railways. Likewise, it would appear that a narrow rather than a wide distribution of orders is undesirable, not only from the standpoint of railway supply concerns as a whole, but also from the standpoint of the railways. The giving of orders to a comparatively small number of concerns will tend to reduce the number of concerns in the supply business. This will tend to create monopolies; to increase the difficulty of holding down prices; and to reduce the amount of competition in improving and developing specialties for the railway market.

The Railway Business Association has asked its members to report to it their experiences in dealing with the purchasing department of the Railroad Administration and to offer it their suggestions as to how the railway supply industry can co-operate with the Railroad Administration. No doubt some good suggestions will result from this canvass of the situation. In our opinion, one of the main things needed to insure that purchases shall be made on a sound basis is that the mechanical, engineering and other technical officers of the railways shall be advised with more freely by those doing the buying and that their recommendations shall be given very much more weight. They are the men who know best the merits of the various articles the railway supply companies have to sell and who are, therefore, best able, having in mind both quality and price, to say how orders can most advantageously be distributed.

Government Operation vs. Private Management and Profit Sharing

OPPORTUNITY FOR a comparison of the results of government operation, with a guarantee of net income to the private owners, and private ownership and operation under a plan of profit-sharing between the corporation and the government, will be afforded by the plan which has just been adopted for handling the express business of the country.

The four principal express companies have now been merged and, subject to the competition of the parcel post, will be given virtually a monopoly of the express business, although under strict government supervision and control. The railroads, although they are officially said to be under "federal control," will be actually under the exclusive management of the government when the new federal managers are appointed, and the corporations that own the property, having for some time been considered as agencies of the government, are now transferred to the role of landlords whose principal function is to collect their rent, pay their interest, dividends and taxes, see that the tenant does not injure the property and make such improvements to it as the tenant desires and is willing to pay the interest on—although there has been some contention from the government side that some of the aforesaid improvements must be

made regardless of interest considerations. The railroad corporations will also continue to look after their outside investments but these are aside from the question of transportation. The comparison is at least an interesting one in spite of the disparity in the magnitude of the operations and the character of the business.

In the plan adopted for dealing with the express companies, an attempt has been made to avoid what many have considered a defect in the plan under which the government is operating the railroads. It has been argued that much of the incentive to efficiency and economy on the part of railroad officers has been removed by the guarantee of earnings. Perhaps that argument no longer applies since the corporations, whose earnings are guaranteed, are no longer to have anything to do with operation, which is to be under the direction of federal managers responsible solely to the Railroad Administration in the same way that they formerly were to their directors. At any rate the incentive afforded under private management by the desire to earn a profit and the necessity for making both ends meet no longer applies to the management of any particular unit of the railroad system.

When it was proposed to adopt a similar plan for the express companies the government declined and instead it has worked out an arrangement by which there is an incentive to earn a profit, yet the amount of the profit that goes to private capital is to be limited by the plan of division with the government on a sliding scale. The scaling down of the capitalization of the four great express companies from a total of $57,000,000 to about $35,000,000 and the possibilities for economy afforded by unified operations should insure a greater opportunity for the payment of dividends, particularly if the application for a 10 per cent advance in rates now pending before the Interstate Commerce Commission should be granted, whereas the express companies recently have been in a serious financial condition. The Interstate Commerce Commission's report of express revenues and expenses for the calendar year 1917 just issued, shows that the eight companies covered in the report had a deficit for the year of $184,305 as compared with operating income for the previous year of $8,926,075 and this was in spite of an increase in gross revenue from $190,000,000 to $222,000,000.

The percentage of the gross earnings which is to go to the government, 50¼ per cent, was arrived at by taking the average for 10 years of the payments by the express companies to the railroads for express privileges, but that part of the bargain is more favorable to the companies than the former arrangement because they will have a single contract with the government, instead of separate contracts with the individual railroads, and will thus be saved a large amount of accounting which has formed so large a proportion of their expenses.

While it is apparent that the government has driven a close bargain with the express companies, limiting their profits to a modest return on a greatly reduced capitalization, the condition into which the express business had fallen had become so precarious that the new plan undoubtedly will be regarded as a great measure of relief. Harassed on all sides with increased expenses, subject to a competition with the parcel post under conditions which gave every advantage to the latter, overwhelmed with a large volume of traffic that formerly went to the railways while they were dependent upon the railways for cars in which to handle the business, the express companies saw no way out except the plan which had been followed in the case of the railroads, particularly as their affairs were so closely bound up with those of the latter.

The arrangement adopted at least gives them an opportunity to stay in business, while the railroad corporations are practically shelved for an indefinite period, and will also give the express company a large opportunity to demonstrate its capacity for public service.

Wage Awards and the Shortage of Labor

THE LONG HERALDED WAGE ADVANCE which was approved by the director general on May 25, has resulted in very general dissatisfaction in many quarters. This is due primarily to the computation of the increases on the basis of the rates paid on December 31, 1915, two and one-half years ago. While the wage commission followed a logical course in computing the increased costs of living and the increases in wages necessary to compensate therefor on a pre-war basis, the roads in many cases had already given their employees, individually or collectively, increases equal to or greater than those awarded by the wage commission with the result that many employees now receive no increases whatever. This in itself, while disappointing to those employees, would not have been so serious if the employees had not been led to build up hopes of universal increases. When these hopes were shattered, as they were in the cases of thousands of employees, the disappointment and dissatisfaction were keen. This was made evident at once by threatened strikes among organized employees in the shop crafts and a deluge of formal protests. This dissatisfaction will also be reflected among the unorganized employees by their exodus into other industries.

The situation is particularly acute in those branches of railway service employing unskilled or semi-skilled labor for which only a limited amount of training is required, as in the track and car repair departments. Here the wages are the lowest, the competition with other industries the most severe and the turnover the highest. As an indication of the present high turnover, the Pennsylvania Railroad kept a special record for the ten-day period from May 27 to June 5, in which interval 4,477 employees left the service and 5,122 were hired (exclusive of general office employees), the net gain of 645 occurring entirely in the last two days. As the railroad on which this comparison was made employs approximately 150,000 men, this is equivalent to an annual turnover of approximately 100 per cent. When it is considered that comparatively few changes occur among enginemen, conductors and other employees, who secure their positions only after a considerable length of service, the high rate of turnover in the other branches becomes more evident. Even this high rate is going to be greatly increased within the next few weeks. A provision in the wage award stipulates that no increase shall be paid to an employee who leaves the service voluntarily. Owing to this fact many men who receive relatively small increases are waiting to receive their back pay before leaving the roads and as soon as they get this they will go to other industries.

The greatest competition for labor which the railways are meeting at the present time is that from industries engaged in war work, such as the manufacture of munitions and the building of ships. In these industries wages have risen out of all proportion to the advances on the railroads. It is therefore not surprising that many men are leaving the roads for these industries, especially as the plea that those employed by them are engaged in patriotic service can be made as forcibly by the ship yards and munition plants as by the railways.

The adequate maintenance of locomotives and the prompt repair of cars are essential to the successful handling of the heavy business now being offered to the roads and which will be greatly augmented when the grain begins to move

in a few weeks. The Railroad Administration has shown its realization of the necessity for a larger plant by authorizing the expenditure of nearly $500,000,000 for addition and betterment work on the roadway this year. The demands for the current maintenance of tracks and structures are equally pressing. At the same time progress on all of this work is being greatly impeded by the lack of men, a condition which is becoming more severe as the season advances. Since the railways are unable to secure the men that are needed to keep the roads in proper condition, some method must be devised and, devised promptly to secure sufficient men, either by the removal of the restrictions on the importation of labor from Mexico and other sources, or by the fixing of relations between the wages and working conditions offered by industries and contractors on government work in comparison with those which the roads are permitted to offer in a way to remove the adverse competition which now exists.

Boston & Maine

THE INCREASE IN THE COST of fuel on the Boston & Maine in 1917 as compared with 1916 would have left the company with almost no margin over interest charges, even if there had been no other increases in unit costs of materials and of labor. As it was, the Boston & Maine earned $59,451,000 in the calendar year, 1917, or over 7 per cent more than was earned in 1916; but operating expenses amounted to $47,165,000, an increase of 23 per cent over the previous year, notwithstanding the fact that charges for maintenance of way were no higher in 1917 than in 1916. It is pretty safe to say that the Boston & Maine will be unique among the larger roads in the small increase in taxes. Taxes amounted to $2,157,000 or only a few thousand dollars more than the 1916 taxes. Gross income available for interest charges amounted to $11,358,000, or $4,884,000 less than the 1916 gross income. Interest charges call for $11,778,000, leaving a deficit in 1917 of $419,000. All of the interest charges, however, were not paid and there is now $3,228,000 interest matured which has not been paid. The higher unit cost of fuel alone increased expenses by $4,000,000.

The following table shows the percentage of each class of operating expenses to operating revenues:

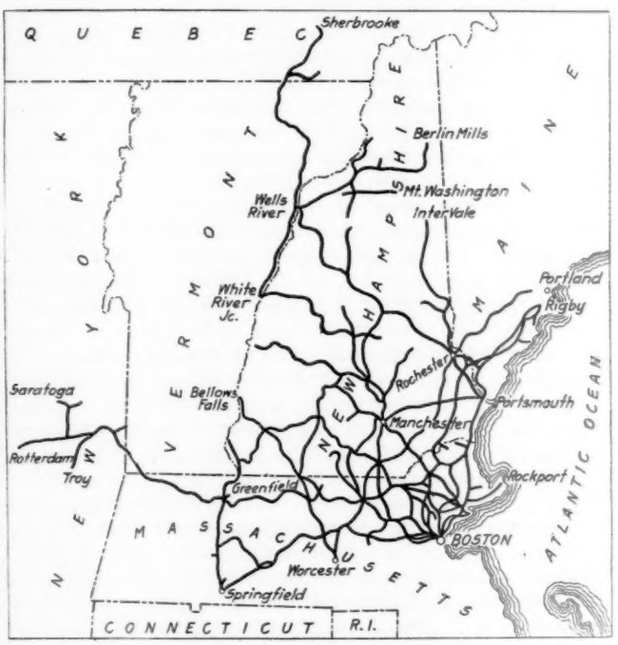
	1917.	1916.
Maintenance of way and structures	10.4	11.1
Maintenance of equipment	14.8	12.8
Traffic	.7	.8
Transportation	50.4	41.7
Miscellaneous	.5	.4
General	2.5	2.3
Total	79.2	69.1

In so far as better operation is concerned, the Boston & Maine is making steady progress. The ton mileage carried in 1917 was 3,342,000,000; an increase over 1916 of 4.7 per cent. The average revenue train load was 383 tons, an increase of 4 per cent over the previous year. The average carload per loaded car was 19.42 tons, an increase of 9.9 per cent over the previous year. The increased train loading was particularly good because traffic conditions were such that there was a greater proportion of empty car mileage in 1917 than in 1916; and there were only four new locomotives taken into service, so that the gain of over 15 tons per train was due largely to the efforts of officers and employees.

The principal changes in character of traffic were a decrease in tonnage of products of agriculture and the tonnage of manufactures carried with a large increase both in tonnage of anthracite coal and of bituminous coal carried. In 1917, 2,805,000 tons of anthracite was carried, or over 1,000,000 tons more than in 1916; and 4,162,000 tons of bituminous coal was carried, an increase of 752,000 tons over 1916. The total tonnage of manufactures was 6,016,000, or 623,000 tons less than in 1916.

There was a substantial increase in passenger business, the total number of passengers carried one mile being 927,000,000, or over 9 per cent more than in 1916. In June, 1917, Camp Devens—the cantonment which the war department built near Ayer, Mass.—was opened and this presumably added largely to the passenger business of the two divisions of the Boston & Maine serving this section of Massachusetts.

James H. Hustis, who was, up to the time of the receiver-



The Boston & Maine

ship, president of the Boston & Maine, and who was appointed by the court temporary receiver, has been appointed district federal manager of railroads in New England by the Railroad Administration. He retains, however, his duties as an officer of the court in charge of the Boston & Maine. During the year $2,344,000 was spent for additions and betterments. The work of physical rehabilitation of the Boston & Maine is going on, but, of course, not on as large a scale probably as would be the case were conditions normal. It would appear to a student of the Boston & Maine situation, without long continued intimate knowledge of the physical condition of the whole property, that the installation of modern, scientific principles of railroading, and the carrying out of the physical betterments such a program would necessitate, and the readjustment of the rental situation are more important for the return of the Boston & Maine to solvency than large expenditures for additions. It may be a recognition of the importance of carrying on the program which Mr. Hustis has inaugurated of improved operating methods, improved relations between employees and officers and between the public served and the railroad personnel that the court, Mr. Hustis himself, and the Railroad Administration came to the agreement to have Mr. Hustis continue to act both as receiver and as district federal manager.

Under the federal control act, it would be possible to use a part of the so-called revolving fund created by the act to purchase securities of a reorganized Boston & Maine;

and efforts are now being made to carry out a reorganization under federal supervision and approval.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917.	1916.
Average mileage operated	2,305	2,305
Freight revenue	$35,080,737	$33,640,587
Passenger revenue	17,814,738	16,052,106
Total operating revenue	59,450,779	55,383,545
Maintenance of way and structures	6,192,311	6,132,045
Maintenance of equipment	8,786,745	7,088,573
Traffic expenses	446,565	430,298
Transportation expenses	29,957,651	23,078,034
General expenses	1,473,770	1,263,188
Total operating expenses	47,164,941	38,251,716
Taxes	2,156,649	2,091,089
Gross income	11,358,313	16,242,791
Net income	419,384*	4,790,874

*Deficit

Chicago, St. Paul, Minneapolis & Omaha

LIKE ITS PARENT COMPANY—the Chicago & North Western—the Chicago, St. Paul, Minneapolis & Omaha had to meet in the year ended December 31, 1917, greatly increased charges for labor, for fuel, for repairs to locomotives and rolling stock and to a lesser extent for maintenance of way and structures. Unlike the North Western it did not increase its operating revenues greatly, the increase in total operating revenues being only $622,000 or about 3¼ per cent, and the increase in freight revenues only one-third of one per cent.

The total operating revenues for the road during 1917 were $21,477,000 as compared with $20,855,000 in 1916. The increase was chiefly in passenger revenues, which were 6 per cent greater in 1917 than 1916. Operating expenses increased from $13,609,000 to $15,841,000, bringing the operating ratio from 65 up to 74 per cent; the net revenue from operations was $5,635,000, or $1,611,000 less than in 1916. The net income was $2,119,000. The usual dividend of 7 per cent on the preferred stock was paid but only 5 per cent on the common instead of 7 per cent as in 1916; the balance for the year was $403,000, as compared with $1,628,000 in 1916.

The freight revenue earned during the year totaled $13,885,000, representing an increase of 0.34 per cent over the high figures of 1916. This increase was due, however, not to an increase in tons carried or even in the total ton-mileage but to an increase in the revenue per ton-mile from 8.1 mills to 8.3 mills. There was in fact a decrease in the total ton mileage of 2.11 per cent. With this decrease in ton mileage there was a 5 per cent decrease in freight train mileage, the average load per loaded car having been increased from 22 to 23 tons and the average train load from 414 tons to 429 tons. With this almost stationary level of freight traffic on the high basis of 1916, there was an increase of 6 per cent in passenger revenues. The number of passengers carried showed a slight decrease, but the average distance each passenger was carried and similarly the average revenue per passenger, showed increases.

The total increase in operating expenses for the year as compared with 1916 amounted to $2,233,000. The increase in charges for maintenance of way was not considerable, being only $121,000. Increases in the cost of labor and other items were partly balanced by decreases in the amounts spent for rail and ballast, these latter decreases being the result presumably of the difficulty of securing steel for the usual program.

Charges for maintenance of equipment increased $482,000 in 1917 over 1916, these increases being represented almost entirely by more expensive repairs to locomotives and freight cars.

It was, of course, in transportation expenses that the greatest increases in costs were shown, because of the higher compensation for labor and for fuel. The total increase in transportation expenses was $1,599,000 of which increase $534,000 was in labor and $998,000 in fuel. The cost of fuel for train locomotives alone was over 40 per cent greater in 1917 than in 1916.

During the year $884,000 was spent for additions and betterments exclusive of additional equipment. Of this

At the end of the year the company had cash on hand $473,000 as compared with $2,519,000 at the close of business in 1916. The company had on hand also $3,176,000 worth of materials and supplies, over twice as much as at the end of 1916. On December 31, 1917, there were $500,000 in loans and notes payable as against none in December 31, 1916, and miscellaneous accounts payable had increased from $149,000 to $343,000.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917.	1916.
Average mileage operated	1,749	1,753
Freight revenue	$13,884,710	$13,837,306
Passenger revenue	5,741,038	5,414,952
Total operating revenue	21,476,509	20,855,286
Maintenance of way and structures	2,481,820	2,360,323
Maintenance of equipment	3,016,674	2,534,794
Traffic expenses	344,105	356,121
Transportation expenses	9,279,431	7,680,387
General expenses	544,356	498,883
Total operating expenses	15,841,318	13,608,879
Taxes	1,327,995	1,053,393
Operating income	4,298,538	6,185,981
Gross income	4,837,725	6,664,051
Net income	2,118,589	3,714,975
Dividends	1,715,986	2,087,222
Surplus	402,603	1,627,754

New Books

War Adjustments in Railroad Regulation. Edited by C. H. Crennan. 6 in. by 9 in., bound in cloth, 334 pages, non-illustrated. Published by the American Academy of Political and Social Science, Philadelphia, Pa. Price, paper, $1, cloth, $1.50.

This volume of the Annals of the American Academy of Political and Social Science deals exclusively with the problems of railway regulation. It contains 23 papers on this subject including the following: Principles and Practices of Car Service Regulation by H. E. Byram; Federal Control of Railroads in War Time by Max Thelen; Regulation of Car Service Under Government Control of Operation by John J. Esch; Reconstituting Railroad Regulation by George A. Post; Government Operation of American Railroads by Clifford Thorne; Physical Needs of the Railways Under Government Control, by Julius H. Parmelee and Adjustment of Labor's Demands During Federal Control of Railroad Operation by Gleen E. Plumb.

Reports of Committees of the American Association of Railroad Superintendents. Edited by the Secretary. 188 pages. Illustrated. 6 in. by 9 in. Bound in Paper. Published by the Association. J. Rothchild, Secretary, Union Station, St. Louis, Mo.

Owing to the fact that the thirteenth annual meeting of this Association which was scheduled to be held in Minneapolis, Minn., on August 8-10, 1917, was indefinitely postponed, the reports of the committees which were to have been presented at that meeting have been published in a volume which also contains a number of valuable papers on transportation problems. These include papers by W. G. Besler, president and general manager, C. R. R. of N. J.; L. F. Loree, president, D. & H.; L. F. Johnson, president, N. & W.; E. Raymond, general superintendent, A. T. & S. F.; W. S. Williams, general superintendent, Illinois Central, and others. Reports are also presented on a large number of subjects of immediate interest to transportation men.

Construction Progress on the Alaskan Railroad*

The Main Track Has Been Laid to Mile Post 211 on This 471-Mile Government Project

By Col. Frederick Mears, U. S. A.
Formerly Member of the Alaskan Engineering Commission

IN THE SPRING OF 1914, President Wilson appointed the Alaskan Engineering Commission, with William C. Edes designated as chairman and chief engineer; which commission was thereby directed and empowered to make the field surveys, detailed examinations and reports under the general direction of Franklin K. Lane, secretary of the interior. The results of the season's work were embodied in a report by the Alaskan Engineering Commission, and formed the basis for the President's action in the selection of what is commonly called "The Western Route" for the government railroad, running from Seward on the Kenai peninsula to Fairbanks, the head of navigation on the Tanana river, a distance of 471 miles.

The first link in the chain to connect tidewater with the interior of Alaska and the coal fields was the single-track, standard-gage railroad, starting at the town of Seward, at the head of Resurrection Bay. This railroad, originally called the Alaska Central and later changed to Alaska Northern, was first conceived by certain Seattle capitalists in 1903 for the purpose of securing a more direct route from the Pacific Ocean to the interior of Alaska. The ultimate intention was to extend the line northeasterly to Circle City, about 130 miles from Fairbanks. Later it was hoped to open extensive coal deposits known to exist on the Matanuska river.

Actual construction began at Seward in 1904, and grading was finished and track laid to Kern creek, mile 71, and some work was done along Turnagain Arm north of Kern creek, but in 1909 all construction work was suspended.

Purchased by United States Government

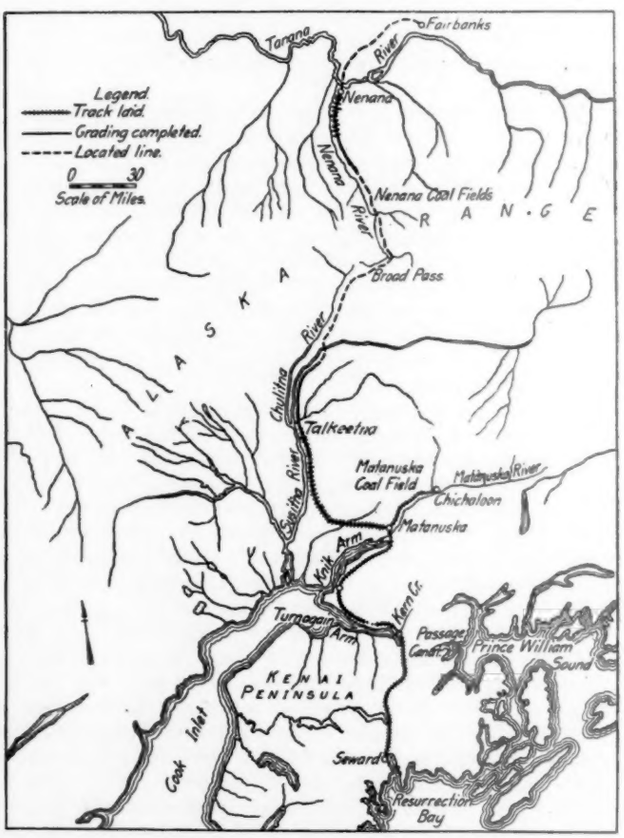
In April, 1915, a formal contract was entered into by which this road was to be acquired for the sum of $1,150,000, much less than its original cost, and a sum within the value of the physical properties as computed by our engineers. In June, 1915, when the season opened, control of the road was taken over by the government, but it was not until August 25, 1915, that litigation over the title ceased and an initial installment of $500,000 was paid.

The Alaskan Engineering Commission began the repair of the Alaska Northern in the early summer of 1916, about the time that the final payment of $650,000 was made (June 30, 1916), and the United States Government came into full possession of the property. During the summer, about 500 or 600 men were employed in various branches of construction work.

For the greater part of the distance along the line of the railroad the right-of-way had never been cleared for more than a few feet on either side of the track. During 1916, the right-of-way was cleared to a width of 100 feet for a distance of 35 miles. Other forces were used to rebuild the grade and repair the roadbed and track. In the original construction of the road, in order to save expense, much curvature had been introduced. Many wooden trestles were built to save the cost of embankments, and these, in many instances, were placed on sharp curves. A number of these structures were badly decayed and needed renewing. A relocation of parts of the line was made and it was found feasible to replace a number of the structures by embankments, and at the same time greatly improve the alinement. Considerable work of this nature was done by station men during the season, and the line was vastly improved, especially between miles 7 and 12, and between miles 18 and 20. About 12 miles of track was raised on its original alinement, it having been built too low to allow proper drainage, principally between Seward and mile 4, and between mile 33 and 40.

Bridges and Trestles

A new bridge, consisting of five pony truss spans of 56 ft. each, was built across the Resurrection river at mile 3, to replace an old trestle, badly decayed, which originally was built too low. A total of 2,172 ft. of entirely new trestle bridges was built at different points, where needed, to replace abandoned structures, and about five miles of bridging was thoroughly inspected and repaired. The superstructures, generally speaking, were found to be in good condition for light traffic.



Progress Map of the Alaskan Railway

From the south end of the Seward yard, north for about five miles, the old 56-lb. steel was replaced with new 65-lb.

*Abstracted from an article in the Alaska Railroad Record. A description of this line appeared in *Railway Age Gazette* of April 20, 1917, page 828.

steel, obtained from the stock bought with the railroad, and enough 70-lb. steel was received and distributed to complete the line to mile 12. There were placed under the track 30,000 cu. yd. of gravel ballast and about 80,000 cross ties. Considerable work was done in the terminal yard at Seward, and about a mile of new sidings was laid, and a wye put in. An industrial spur was laid, following along the water front on the south boundary of the town, affording rail facilities for warehouses and industries.

The rolling stock bought with the railroad, consisting of 3 engines, 3 box cars, 2 cabooses and 17 flat cars, was put in serviceable condition, and to them have been added 2 box cars, 6 flat cars, 2 cabooses, 10 12-cu. yd. Western side-dump cars, and 2 passenger coaches. The repairs to the property during the summer made it possible to operate a train consisting of a 60-ton engine, caboose and several cars, from Seward to Kern creek, on October 2, 1916.

Season of 1917

The work of rehabilitation continued steadily during 1917. The number of men employed varied from 300 in January to 700 in August, with a corresponding reduction in the late fall. About 400,000 cu. yd. of material were moved in this process, resulting in the complete repair of the track and roadbed for standard traffic from Seward to the first summit, mile 12, and the partial repair of roadbed, track and bridges, from mile 12 to Kern creek.

The road was operated from Seward to Kern creek during the summer, whenever the train movement did not interfere with the repairs or changes to track and roadbed. Operation was continued in this manner until January, 1918, when traffic north of mile 40 was interrupted by the deep snow.

TABLE OF YARDAGE

REHABILITATION ALASKA NORTHERN

	Common	Loose rock	Frozen	Solid rock	Total
Excavation during 1916 (miles 1-71)	180,105	14,153	.....	72,016	266,174
Excavation during 1917 (miles 1-71)	188,453	8,392	10,467	220,992	428,304
Total	368,558	22,545	10,467	293,008	694,578

Cost to December 31, 1917

Purchase of Alaska Northern	$1,157,839.49
Rehabilitation, Alaska Northern, including repairs and maintenance, but not including equipment or supplies on hand or in transit, to December 31, 1916	774,277.51
January 1, to December 31, 1917	845,660.95
Total	$2,777,777.95
Equipment	181,255.44
Supplies on hand and in transit	369,393.01
Total	$3,328,426.40

Average cost of road to December 31, 1917, 70.8 miles, not including equipment or supplies on hand, about $39,000 per mile.

Work on the New Line

On March 4, 1915, Congress passed an act appropriating $2,000,000 for the beginning of construction on the Alaska railroad. The work which was contemplated with the initial appropriation was to build from Anchorage to the Matanuska river, a distance of 35 miles, covering about one-half the distance from tidewater to the Matanuska coal fields. In addition to the building of the railroad grade, certain terminal facilities of a temporary nature were planned at Anchorage.

The first work began in May, 1915, when clearing of the right of way commenced, followed by grading forces who were placed upon the work as rapidly as the engineers could stake it out. Construction camps were established at various points along the line, and these camps, as far as possible, were supplied by barges working along the east shore of Knik Arm. A considerable outfit of freight teams was also required to move supplies from the points along the Arm to the grading camps.

At the end of 1915, the right-of-way had been cleared towards the coal fields for a distance of 40 miles. The grading had been completed ready for track for about 35 miles, and track had been laid to Eagle river, a distance of 13 miles. About three miles of yard track had been laid at Anchorage in the material yard and dock approaches.

Continuing Construction During 1916

Eagle river is crossed in mile 127.6 by a long wooden bridge with a 60-ft. truss span over the main river channel. The erection of this bridge consumed two or three months after track had reached the bridge. As soon as the structure was complete, track gangs started laying steel towards Peters creek, mile 136.5, eight miles distant, at which point the railroad comes very close to the east shore of Knik Arm, both as to location and grade elevation. The track was laid during a severe winter under trying conditions, and was put down solely for the purpose of pushing material and supplies to Peters creek, which point could profitably be used as a winter shipping base for all construction materials and supplies needed for the Matanuska branch line.

During the spring and summer of 1916, work was actively continued on the branch line, with the result that by November the track was pushed out to King river, a point 61 miles from Anchorage, 23 miles from the junction, and 14 miles from Chickaloon, the end of the line to the coal fields. A large winter construction camp was established at the end of steel, from which to continue work towards Chickaloon.

In the month of March, 1916, several station gangs were given contracts for clearing right-of-way on the main line north of Matanuska, leading toward the Susitna valley, as it was desirable to have this right-of-way cleared of timber and undergrowth as early as possible to make way for grading. Under this plan the right-of-way was cleared for a distance of 10 miles north of Matanuska Junction early in the year. At the beginning of 1916, the available funds for the prosecution of the construction work were insufficient to meet all demands, and it was accordingly decided to favor the work on the branch line toward the coal fields. This caused an unavoidable delay in the beginning of active operations on the main line. About July 1, when money was available for the purpose, grading gangs started work north of the Junction, and early in the summer the first 10-mile section was completely covered.

Revision of Line

The size, rapid growth, and general importance of the town of Anchorage made it desirable in 1916 to put the main line of the railroad through the town, instead of passing four miles to the eastward as originally surveyed. The new line swings around the town on a low grade elevation, and crosses Ship creek immediately at the west end of the freight yards, connecting with the line formerly known as the Ship creek spur. The so-called Ship creek spur line, which had been built the previous season, was utilized and became a part of the new main line.

The right-of-way was cleared on the new line south of Anchorage before the snow was off the ground, and grading commenced in this district in the month of May. The work was pressed during the summer and in the early fall the grade was made ready for the track, which was laid southward from Anchorage for a distance of 10½ miles. While this work was in progress materials and supplies were shipped around by water into Turnagain Arm, and distributed at various camps along the Arm as far south as Rainbow creek (mile 94).

Work Started on Upper Susitna River

The adopted location for the new railroad closely follows the Susitna river for a distance of 75 miles, and advantage was taken of this situation to attack the railroad line along the upper river. While it is necessary to stretch the imagi-

nation a little to say that the Susitna river is a navigable stream, still it was found possible to operate a steam-driven, stern-wheel river boat, capable of carrying a cargo of 100 tons on its own bottom, from the construction base at Anchorage to the old Indian village of Croto, a point about 50 miles above the mouth of the river. The Commission purchased the river steamer "Omineca" for this work (which had been used for similar purposes for the Grand Trunk Pacific in the construction of its line in Canada), and used it continuously during the 1916 season, between the points named, a distance of about 70 miles.

Light draft boats were operated on the upper river. They carried all of the materials and supplies used during the season to the amount of 2,685 tons. They also transferred the various superintendents, civil engineers, construction men, and station gangs to the new work, to the number of 1,019 persons.

The headquarters for the Talkeetna district was established at a point called Talkeetna, at the confluence of the Talkeetna and Susitna rivers. During the season the right-of-way along the adopted location was cleared from Sheep creek (mile 203) to Indian river (mile 265), and the roadbed was graded in various disconnected sections over a total distance of 22.8 miles. At the same time additional construction materials and supplies were delivered at a point on the upper river, near some heavy rock work, where they were available to use the following season, before the river opened to summer navigation.

Terminal District

Although a good camp had been established at Anchorage during the 1915 season, there still remained a large amount of work to be done in order properly to equip this important point as a construction base. Accordingly, during the 1916 summer season a number of buildings were erected. The completed track, which was extended from Peters creek (mile 136½) to Matanuska Junction (mile 151), was also taken over by the Terminal district, and maintained and operated as a revenue-producing line. On January 1, 1916, the commission started to collect fares from all persons desiring to take advantage of the construction trains, on the basis of 6 cents per passenger mile, and during the winter and spring of 1916 a complete set of blank forms for railroad operation were prepared and put into use, in accordance with the Interstate Commerce Commission's requirements.

Comparatively large construction forces were continued at work during the winter of 1916-17. At the close of the 1916 season there remained about 14 miles of heavy grade to complete along the Matanuska branch line, near the coal fields, and this part of the line (almost entirely solid rock), was entirely covered by the month of February. Station gangs were established at such intervals as to insure completion of the line during the early summer. About 320 men were employed on this district through the winter, and by August 15 the line was completely graded. Track was laid ahead from King quite rapidly, using a Roberts track-laying machine to put down the steel and ties. The end of the line reached Chickaloon on October 20, 1917.

The construction department worked a good many men along Turnagain Arm, south of Anchorage during 1917. About 1,000 men, divided into approximately 50 station gangs, were employed throughout the winter and early summer, and at the time of the present writing (March, 1918) the grade has been practically completed between Anchorage (mile 115) and Bird Point (mile 81). Track has been laid southward from Anchorage for 24 miles, reaching a point known locally as Falls creek, or mile 91. The remaining interval between Bird Point (mile 82) and Kern creek (mile 71) will be completed in August, 1918.

The line from Kern creek (mile 71), (the end of the Alaska Northern Railroad), to Potter creek, mile 101, along the north shore of Turnagain Arm, is the heaviest continuous construction on the whole railroad. Occasionally, for a short distance, a bench occurs, on which the line can be placed with easy construction; but for the greater part of the distance, the line has to be benched in on heavy transverse slopes. The contour of the country is very irregular, making it impossible to secure light work even by the introduction of very sharp curvature. In many cases deep embankments and gulches occur, and in order to save expensive cuts in the precipitous rock bluffs it was necessary to make heavy fills, the slopes extending into the waters of Turnagain Arm, where they are affected by the heavy tides. The rock encountered is mostly of a hard slate, with some quartzite dikes.

Character of Work Along Turnagain Arm

Many timber culverts and small trestle openings were required along Turnagain Arm, and at several points truss bridges were necessary over the larger streams. It is estimated that about 8,000 lin. ft. of snowsheds will eventually be required in this district; and these sheds will have to be of very substantial character to withstand the shock from the slides which frequently start from long distances up the cleared mountainside.

About 2,250,000 cu. yd. of excavation has been accomplished along Turnagain Arm at the present writing, about half of which (or a little more than 1,000,000 cu. yd.) was solid rock. There remained to complete this section only 170,000 cu. yd. on January 1, 1918.

Work in the Talkeetna district was somewhat handicapped during 1917 on account of shortage of funds, but nevertheless a small force worked during the summer, with the result that track was pushed northward to Montana creek, mile 211, and with the exception of a few disconnected sections, grade was made ready for track between Montana creek (mile 211) and Dead Horse hill (mile 249).

Some of the important items of work accomplished in the Anchorage division between May 1, 1915, and December 31, 1917, are the following:

Excavation	7,530,697 cu. yd.
Permanent bridges	18,031 lin. ft.
Track, main line, including Matanuska branch	158 miles
Completed line from Anchorage to Matanuska coal fields (74.9 miles), original estimate	$3,352,243.00
Cost to December, 1917:	
Main line, as far as Matanuska Junction	1,479,587.68
Matanuska branch	2,183,776.13
	$3,663,363.81

THE GIBRALTAR STRAITS TUNNEL.—Interest has lately revived in the scheme for a tunnel beneath the Straits of Gibraltar, which has, like that for a railway link between England and France, made an appeal to engineers for a generation or more. Some of the technical aspects of the project have been under discussion before the French Society of Civil Engineers, and it does not appear to be thought that there are any abnormal difficulties on the engineering side. Owing to the depth of water and character of the sea bed and the underlying strata, it would be necessary to construct such a tunnel at a depth, it is believed, of some 840 meters (2,756 ft.); and the length between Tarifa, the suggested point of departure on the Spanish side of the Straits, and either of the alternative points of emergence on the Morocco coast, would be about 15½ miles. The London Times points out that it is assumed by the advocates of the scheme that the cost of construction would not exceed £10,000,000 ($50,000,000), but necessary port improvements would call for the expenditure of an additional £4,000,000 ($20,000,000). There can be no doubt that the linking of the European and African railway systems would give a great stimulus to French and Spanish trade, and on the assumption that the tunnel beneath the Straits of Dover is constructed, the tunnel would provide over the Trans-African railway a through route between England and South Africa.

Doings of the United States Railroad Administration

Director General McAdoo Gives Out a Statement as to the Policy of Federal Control

WASHINGTON, D. C.

DIRECTOR GENERAL MCADOO on June 15 gave out the following signed statement of the policy of the Railroad Administration:

"The policy of the United States Railroad Administration has been informed and shaped by a desire to accomplish the following purposes which are named in what I conceive to be the order of their importance:

"*First,* the winning of the war, which includes the prompt movement of the men and the material that the government requires. To this everything else must be subordinated.

"*Second,* the service of the public, which is the purpose for which the railways were built and given the privileges accorded them. This implies the maintenance and improvement of the railroad properties so that adequate transportation facilities will be provided at the lowest cost, the object of the government being to furnish service rather than to make money.

"*Third,* the promotion of a spirit of sympathy and a better understanding as between the administration of the railways and their two million employees, as well as their one hundred million patrons, which latter class includes every individual in the nation, since transportation has become a prime and universal necessity of civilized existence.

"*Fourth,* the application of sound economies, including:

(a) The elimination of superfluous expenditures.
(b) The payment of a fair and living wage for services rendered and a just and prompt compensation for injuries received.
(c) The purchase of material and equipment at the lowest prices consistent with a reasonable but not an excessive profit to the producer.
(d) The adoption of standardized equipment and the introduction of approved devices that will save life and labor.
(e) The routing of freight and passenger traffic with due regard to the fact that a straight line is the shortest distance between two points.
(f) The intensive employment of all equipment and a careful record and scientific study of the results obtained, with a view to determining the comparative efficiency secured.

"The development of this policy will, of course, require time. The task to which the Railroad Administration has addressed itself is an immense one. It is as yet too early to judge of the results obtained, but I believe that great progress has been made toward the goal of our ideals. All those who have had a share in this great work, including especially the members of my staff and the officers and employees of the railways, have shown intelligence, public spirit, loyalty and enthusiasm in dealing with problems that have already been solved and attacking those that still await solution.

"With their continued co-operation, I feel assured of a future in which the lessons of our accumulating experience will be effectively employed to humanize the science of railroading and negative the idea that corporations have no souls."

Operating Statistics Section

The organization of the Operating Statistics Section of the Division of Operation, with W. J. Cunningham as manager, was noted in a recent issue. Circular No. 8, issued by the Division of Operation, announces the functions of the section as follows:

The Operating Statistics Section will arrange for, and supervise, the making of standardized reports and statistics pertaining to the maintenance and operation of railroads under federal control; and will make such compilations of statistics as may be required.

The monthly report of freight operations, heretofore compiled and issued by the Bureau of Railway Economics, will be compiled and issued by the Operating Statistics Section. Railroads will send their individual reports (American Railway Association Form FO 2) for the months of April, May, June and July to the Operating Statistics Section instead of to the Bureau of Railway Economics. Reports for April which have already been sent to the Bureau will be turned over to the Operating Statistics Section.

Effective with the month of August, 1918, statistics relating to maintenance and operation will be required on standardized forms. These forms, and instructions as to their use, will be sent out within the next two weeks.

Uniform Methods of Organizing and Conducting Safety Work

H. W. Belnap, manager of the safety section of the Division of Operation of the Railroad Administration, has issued the following outline of the organization of safety committees, which is recommended to the railroads to be followed in perfecting safety organizations on all Class 1 railroads, as ordered by Circular No. 5 issued by C. R. Gray, director of the division of operation. The recommended outline is for the purpose of establishing uniformity in methods of organizing safety committees, as well as to stimulate an interest in accident prevention and measures intended to reduce the hazards of railroad employment. The recommended form of organization is as follows:

A committee to be known as the General Safety Committee shall be organized, composed of general and division officers of the road, chosen in such a manner that all the different departments of service shall be represented on that committee. The chief operating officer, or such other general officer as he shall designate, shall act as chairman. This committee shall have general supervision of the safety organization.

On each division shall be formed a Division Safety Committee, composed of division officers, with the superintendent as chairman, and one or more representatives of each of the different classes of service.

In each large shop shall be formed a Shop Safety Committee, composed of the principal officers of the shop, with the ranking officer as chairman, and one or more representatives of each of the different classes of service. If the shop is under the jurisdiction of the division superintendent, the committee shall report to the Division Safety Committee, otherwise to the General Safety Committee.

In each large terminal shall be formed a Terminal Safety Committee, composed of the officers in charge, with the superintendent or ranking officer as chairman and one or more representatives of each of the different classes of service. If the terminal is under the jurisdiction of the division superintendent, the committee shall report to the Division Safety Committee, otherwise to the General Safety Committee.

Where conditions require, local committees may be organized in yards, roundhouses, smaller shops, large freight houses, etc.

The General Safety Committee shall meet at least quarterly. Other safety committees shall meet monthly and report proceedings on proper form to the General Safety Committee.

The principal officers of the division, shop or terminal shall be permanent members of the committees. Other members shall serve for a period of six months or a year at the discretion of the chairman, but it is inadvisable to change all the members at one time.

The employee members of the various committees attending metings shall be paid their regular wages and such expenses as they necessarily incur in going to and from committee meetings.

The safety organization should invite the fullest co-operation of every employee in calling to the attention of the various committees, practices and conditions which are not conducive to safety, but such information communicated by any one to these safety committees shall not be used as a basis of disciplinary action.

On each railroad there shall be an officer in charge of safety work. The amount of time which it will be necessary for him to devote to the work should be governed entirely by local conditions. He should compile statistics for the information and guidance of safety committees, issue bulletins, attend all meetings of General Safety Committee; also such division, shop and terminal committees as he feels require his presence in order to maintain the proper degree of interest. He should carefully review minutes of all committee meetings.

The circular states that it is manifestly impossible to formulate suggestions which are universally applicable. In perfecting this committee form of organization, it is realized that local conditions must in every case govern the personnel of each committee. Official titles vary with the individual railroads and in some cases the duties of more than one of the positions indicated may be vested in one person. Committees may, therefore, be enlarged or decreased, as conditions require. The details of the organization of committees is properly left to the managers of the various properties, but it is desired that they adhere as closely as practicable to the outline suggested, which is as follows:

GENERAL SAFETY COMMITTEE

Vice-president or General Manager,
General Superintendent,
Chief Engineer,
Engineer Maintenance of Way,
Signal Engineer,
Superintendent of Motive Power,
Superintendent of Rolling Stock,
Mechanical Engineer,
Superintendent Freight Transportation,
Superintendent Passenger Transportation,
General Claim Agent or Claims Attorney,
Chief Surgeon,
General Storekeeper,
General Safety Agent or Supervisor,
Secretary (of Committee),
Such other officers as are deemed advisable.

DIVISION SAFETY COMMITTEE

Division Superintendent, Chairman

Division Engineer,
Trainmaster,
Master Mechanic,
Road Foreman of Engines or Traveling Engineer,
Signal Supervisor,
Division Storekeeper,
Claim Agent or Adjustor,
District or Division Safety Agent (if any),
(*a*) Yardmaster,
(*a*) Agent or Operator,
(*a*) Roadmaster or Supervisor of Track,
(*a*) Track Foreman,
(*a*) Bridge and Building Department Employee,
(*a*) Engineman,
(*a*) Fireman,
(*a*) Conductor,
(*a*) Brakeman,
(*a*) Switchman,
(*a*) Car Repairer or Inspector,
(*a*) Signalman,
(*a*) Shopman, etc.,
Secretary.

SHOP COMMITTEES

Superintendent of Shops or Master Mechanic, Chairman

Locomotive department
General Foreman,
Roundhouse Foreman,
(*a*) Machinist,
(*a*) Boilermaker,
(*a*) Blacksmith,
(*a*) Sheet Metal Worker,
(*a*) Shop Storekeeper,
(*a*) Electrician,
(*a*) Foundryman,
(*a*) Hostler,
(*a*) Crane Operator,
Secretary,

or

Car department
General Foreman,
(*a*) Carpenter,
(*a*) Car Repairer or Inspector,
(*a*) Woodworker,
(*a*) Millwright,
(*a*) Machine Operator,
(*a*) Painter,
(*a*) Electrician,
(*a*) Storekeeper,
Secretary.

NOTE.—In some instances it may be advisable to have separate committees in the car and locomotive departments—in others a joint committee is preferable.

TERMINAL SAFETY COMMITTEE

Superintendent, Trainmaster or General Yardmaster, Chairman.

Day Yardmaster,
Night Yardmaster,
(*a*) Switch Foreman or Yard Conductor,
(*a*) Switchman,
(*a*) Engineman,
(*a*) Fireman,
(*a*) Section Foreman,
(*a*) Station Employee,
(*a*) Car Department Employee,
(*a*) Car Clerk, Checker or Sealer,
Secretary.

Members marked (*a*) should serve for a period of six months or a year at the discretion of the chairman.

This form of organization follows closely that recommended by a committee of the American Railway Association in 1913 (Circular No. 1333.)

W. P. Borland, assistant chief inspector of safety appliances of the Interstate Commerce Commission, has been appointed assistant manager of the Safety Section, and Charles W. Gregg of the New York Central has been added to the staff of regional supervisors, with office at Washington.

Supplement to the Wage Order

The Director General has issued the following Supplement No. 1 to General Order No. 27:

"The following will be added as general rules to Section F, Article II:

"(14) For positions created since December, 1915, the salaries will be readjusted so as to conform to the basis established in General Order No. 27, for positions of similar scope or responsibility.

"(15) Where wages were increased through arbitration or other general negotiations, which cases were definitely closed out prior to December 1, 1915, but which for any reason were not put into effect until after January 1, 1916, the increases fixed by General Order No. 27 will be applied to such basis of wages as if they were in effect in December, 1915."

Interchange Inspection

To the end that interchange inspection work may not be duplicated under government operation of railroads, so that more repair work and less unnecessary inspection will result, the Division of Operation has ordered, in Circular No. 7:

1. That joint arrangements shall be made to prevent such duplication in inspection by arranging all inspection forces at interchange points with a head or chief joint inspector as conditions require, to supervise the forces and see that inspection and repairs are properly made to car equipment.

2. Present M. C. B. Rule No. 2 is modified as follows:

(a) Loaded cars offered in interchange (except those having defective safety appliances) must be accepted by the receiving line, which may either run, repair or transfer lading from car.

(b) The repairs to car or transfer of lading is to be done by the railroad having facilities nearest available. If facilities are equally available by both railroads, the car will be moved to facilities located in the direction car is moving.

3. If car is shopped for repairs due to:

(a) Old defects that existed before car was loaded—.

(b) Lading requiring transfer or readjustment on account of not being in accordance with M. C. B. Loading Rules—.

(c) Overload requiring transfer of lading—.

(d) Not being within clearance dimensions over route it is to pass—.

(e) Not meeting A. R. A. third rail clearance—.

The facilities nearest to car will be used in making repairs to car or transfer of lading.

4. Should the location of facilities require a receiving line to make transfer, the delivering line will not be billed for transfer or readjustment of lading, but the chief joint or head inspector will make report and forward to the head of the mechanical department of both railroads. The railroad responsible for conditions making necessary the shopping of car for old defects or transfer of lading, will impose discipline for willful and inexcusable violation of M. C. B.

Federal Managers and General Managers

B. R. Pollock
Federal Manager, Boston & Maine

S. G. Strickland
Federal Manager, Chicago & North Western

C. H. Ewing
Federal Manager, Philadelphia & Reading and Central of New Jersey

Ralph Peters
Federal Manager, Long Island

H. W. McMaster
General Manager, Wheeling & Lake Erie

B. A. Worthington
General Manager, Cincinnati, Indianapolis & Western

M. S. Connors
General Manager, Hocking Valley

B. C. Stevenson
General Manager, Toledo, St. Louis & Western

H. A. Boomer
General Manager, Lake Erie & Western

L. G. Coleman
General Manager, Grand Trunk Railway in New England

Rules of Interchange and Loading, and A. R. A Rules, the same as instructed in director general's Order No. 8, for violation of safety appliance law.

5. Cars whether loaded or empty having safety appliance defects will have such defects repaired immediately upon discovery and will not be offered in interchange. If necessary to move a car to shops for repairs of safety appliance defects, it must be moved to shops of the company upon whose line it became defective.

6. Empty cars offered in interchange, if in safe and serviceable condition, must be accepted.

7. Bad order cars which previously had been delivered in bad order under load must be repaired by the road making transfer, if it has facilities and material; if not, the nearest repair point on any line, having material and facilities, should make the repairs.

8. With these modifications, owners must receive their own cars when offered home for repairs at any point on their lines where repair facilities and material are available.

9. Such inspectors as are now engaged on duplicate work will be assigned to repair work so as to insure maximum safety of operation and prompt movement of traffic.

Changes in Rate Order

The first break in Director General McAdoo's rate order in response to the many complaints that have been made came on June 12 in the form of a supplement to General Order No. 28 making changes demanded by the state railway commissioners to apply the proposed percentage and specific increases directly to the existing intrastate rates instead of first advancing those rates to the level of corresponding interstate rates and then advancing them again. The state commissioners had asked either that this be done or that they be given further recognition by allowing them to order the advances. The changes which were later announced in the supplement were briefly mentioned in last week's issue. The state commissioners were reinforced in their demand by a large number of congressmen who had been induced to bestir themselves on behalf of shippers and state commissions. A group of southern senators who thought their states were peculiarly affected by the order held a conference in the office of Senator Smith of South Carolina, chairman of the Committee on Interstate Commerce, and joined in a protest to Mr. McAdoo, asking him to confer with them on the subject. Mr. McAdoo designated Director Prouty of the Division of Public Service and Accounting as his representative and Mr. Prouty conferred with the senators. Whether or not Mr. Prouty so understood it, the senators took it that he had power to act in the matter, and they announced after the conference that the state rates, classifications and minimum weights would be taken as the basis for the advance. However, the matter was discussed at a staff meeting of the Railroad Administration before the supplement was issued.

The Director General's statement of the changes made by the supplement was as follows:

The supplement eliminates from General Order No. 28 the provisions to the effect that state rates be cancelled where in conflict with interstate rates and provides instead that the increases on both class and commodity rates prescribed by the order as amended, shall apply to both interstate and intrastate rates; except that between points in the state of Oklahoma the class rates for both single and joint lines shall be as prescribed by the Interstate Commerce Commission in the last Shreveport decision, plus 25 per cent.

The increased class rates are to be governed by the several classifications, both interstate and intrastate, including exceptions thereto and minimum weights that govern the existing rates; except that the minimum 25 per cent class rate scales are subject to the four standard classifications named in the original order.

No change is made in the specific increases provided on commodities except that the increase of 15 per cent on cotton is to apply to any quantity instead of carloads and the provisions on sugar in carloads have been amended to more clearly provide for maintenance of existing relationships.

Intrastate rates and rates for transportation by water not now on file with Interstate Commerce Commission are to be filed, but where now restricted to intrastate traffic, the tariffs are to continue such restrictions.

The minimum charge of $15 per car will apply only to line haul shipments and not to brick, cement, coal, coke, logs, ore, sand and gravel and stone (broken, crushed or ground), on which the existing rates as increased under section 2 of the order shall apply.

Section 20 is amended to provide specifically that the rates to be increased are those existing on May 25, 1918, including changes previously published but not then effective and not under suspension, except that the increases will apply to rates authorized or ordered by the Interstate Commerce Commission prior to May 25, 1918, and published between May 25, 1918, and June 15, and that where rates so authorized or ordered are not published before June 15, they may be increased as provided in the order by subsequent revision.

Section 21 provides the proper legend to be used on the tariffs to provide interstate or intrastate application as authorized by the amended order.

Instructions have also been issued to the railroads to make modifications in the export and import rates as they would be affected by the general order. The order provides for the cancellation of the special import and export rates for the purpose of leaving in effect the domestic rates, but it has been discovered that many of the domestic rates are merely paper rates which have not moved any business and, therefore, have not been kept in line so that the application of these rates would result in very large and disproportionate increases. Therefore, specific advances in import and export rates have been worked out which are to be applied as tentatively reasonable and to go into effect on June 26; after which they may be given further consideration.

Simplified Accounting Practices

Director General McAdoo on June 12 issued two general orders for the purpose of effecting a simplification in the accounting practices of the railroads under federal control, in recognition of the fact that they are being operated as a single system and that their revenues are in effect the revenues of the government.

Settlement of Inter-Road Bills and Accounts

General Order No. 30 provides that, effective July 1, 1918, the following regulations shall govern the settlement of all inter-road bills, statements, and accounts rendered by one carrier under federal control against or for account of another carrier under such control.

(1) Settlements by vouchers and the drawing of drafts in settlement of individual inter-road bills, statements, and accounts rendered by one carrier under federal control against another carrier under such control, except as provided for in paragraph (2) hereof, shall be discontinued.

(2) The regulations herein prescribed shall not include:

(*a*) Settlement of accounts between a carrier under federal control and a carrier not under such control.

(*b*) Settlement of accounts between carriers under federal control for the transactions which do not properly belong on the federal books of either carrier interested.

(3) Each bill, statement, or account made and rendered by one carrier under federal control against or in favor of

another carrier under such control, and forwarded on and after July 1, 1918, shall be plainly stamped on the face thereof, as follows: "Included in settlement, month of ——— 191 ——." Such stamp shall indicate the month in which the amount represented by the account will be included for settlement by the carrier rendering the account, and it shall be included in the same month's settlement account by the receiving carrier. No such bill, statement, or account made and rendered in one month shall be back-dated for a prior month.

(4) On the first of each month each carrier shall prepare and render each other carrier with which it has inter-road transactions, as a basis for a settlement for the month just ended, a statement of debits and credits, in abstract, showing the nature and total of each bill, statement, or account forwarded by it to each other carrier during the preceding month.

(5) There shall be opened as of July 1, 1918, on the federal books of each carrier, a clearance or settlement account with each other carrier under federal control with which it has inter-road transactions.

(6) As inter-road bills, statements, or accounts are made and rendered they shall be charged or credited as the case may be, through the clearance or settlement account prescribed in the preceding paragraph.

(7) As inter-road bills, statements, or accounts are received they shall be:

(*a*) Examined as to correctness, as prescribed in General Order No. 20;

(*b*) Charged or credited to the appropriate operating or other account;

(*c*) Credited or charged (as the case may be) by the receiving carrier to the carrier originating the account through the appropriate clearance or settlement account prescribed in paragraph 5 hereof.

(8) The total of each statement for a given month shall be accepted as rendered, and on or before the fifteenth day of each month subsequent to that for which such statement was rendered the creditor carrier shall draw upon the debtor carrier for the balance between the two statements exchanged by them.

(9) In the event the statement referred to in paragraph 4 indicates that the originating carrier has charged or credited the other carrier with a bill, statement, or account which has not been received, the carrier to which the statement is rendered shall accept the account and credit or debit the originating carrier therewith to the debit or credit of a suspense account. Such receiving carrier shall immediately take the matter up with the originating carrier for the purpose of locating the missing bill, statement, or account. If it be found that such amount was included in the statement in error, adjustment shall be made therefor in a subsequent statement. If manifest errors be found in such statements by a receiving carrier, the attention of the originating carrier shall be called thereto and such error or errors shall be adjusted in the statement for the subsequent month.

Equipment and Facilities Accounts

General Order No. 31 provides that, effective July 1, 1918, the following rules and regulations shall govern the accounting for the use of equipment or facilities of one carrier under federal control by or for the account of another carrier under such control, provided, nothing herein contained shall be construed to warrant the discontinuance of the keeping, rendition and settlement of such accounts by a carrier under federal control in favor of or against a carrier not under federal control, in the same manner as heretofore.

I. *Hire of Freight and Passenger Train Equipment.*

1. The practice of recording, computing and paying per diem, mileage, or rental for the use of freight and passenger train cars of one carrier under federal control by or for account of another carrier under federal control, and the adjustment of differences, reclaims, etc., between such carriers which clearly relate to transactions incurred on or after January 1, 1918, shall be discontinued.

2. Junction cards, interchange reports, location records, and all other records and reports necessary to determine the location of equipment shall be kept, rendered, and compiled as heretofore.

II. *Joint Facilities—Bills for Use of.*

3. Effective with costs incurred on and after July 1, 1918, bills rendered by one carrier under federal control against another carrier under such control for maintaining and operating (including taxes and rental) tracks, yards, terminals and other facilities, including costs to operate equipment used therein, shall be computed, rendered, charged and paid on the following bases:

(*a*) In cases where the tenancy is not changed under government operations: The total cost of maintenance, operation, taxes and rental, as provided for under existing agreements, and the amounts thereof borne by each user, for a period not less than six months ended December 31, 1917, shall be determined by the owning or operating carrier. From such costs, the percentage of the total borne by each user to the total costs shall be determined. The percentages thus determined shall be applied monthly to the total costs incurred on and after July 1, 1918, and bills shall be rendered and paid on the results thus obtained.

(*b*) In cases where tenants or users are admitted to facilities not heretofore jointly used: Federal managers of the facilities to be jointly used shall determine, as between themselves, a fair and equitable arbitrary basis for the apportionment of the total costs of maintenance, operation, taxes and rental which should be paid by each tenant. Such basis shall thereafter during the period of federal control be used by the owning carrier as a basis for preparation and rendition of bills against the tenants or users, and such tenants or users shall pay such bills as rendered.

(*c*) In cases where the number of tenants or users of facilities now used by tenants under agreements with owners is increased or decreased: The literal compliance with the terms of such agreements shall be temporarily suspended, for the period of federal control, and a fair and equitable basis of use shall be determined as prescribed in paragraph *b* preceding, except that due regard shall be given to the terms of existing agreements in fixing such arbitrary basis.

(*d*) In cases where a lump sum charge has been made by an owning or operating carrier which is under federal control for the use of a facility used by another carrier which is under such control, such bills for the lump sum charge shall be rendered and paid during federal control as heretofore; provided, however, if there be a change in such tenancy by the admittance of other tenants or otherwise, and the contractual basis upon which the lump sum charge is made be disturbed thereby, an arbitrary basis of charge by the owner against the tenant or tenants shall be determined as prescribed in paragraph *b* hereof.

4. Details heretofore required in support of joint facilities, bills, statements and accounts shall be discontinued, except that such bills shall show the totals chargeable and creditable, to the primary operating revenue, expense, tax and rental accounts prescribed by the Interstate Commerce Commission, or which may hereafter be prescribed.

5. If materials and supplies, the value of which is carried in the accounts of one carrier under federal control, be used by another carrier under such control for maintaining or operating equipment or facilities jointly used, the value at which such materials and supplies are carried in the accounts of the carrier furnishing them shall be billed against and paid for by the carrier using them as heretofore,

except that percentages for overhead and other carrying expenses shall not be added to the cost thereof.

Traffic Committee Abolished

The Interregional Traffic Committee, appointed by Director General McAdoo on February 9 to make a study of the larger traffic movements with a view to seeing what steps could be taken to shift traffic from the more seriously congested ports, has completed its work and has been abolished. The committee, which consisted of B. L. Winchell, chairman, George F. Randolph and T. C. Powell, has submitted various advisory reports to Mr. McAdoo and the Division of Traffic, regarding changes which could be made in the routing of traffic now that the railroads are being operated as a single system and it is understood that some of its recommendations have already been put into effect.

Cincinnati Freight Control Committee

The Division of Operation has formed a Committee of Freight Traffic Control, composed of F. B. Mitchell, chairman; G. Krause, B. Arnold and J. B. Ford, with office at Cincinnati, Ohio, to secure all necessary reports covering freight traffic passing Ohio river gateways at Cincinnati, Ohio, Louisville, Ky., Cairo, Ill., Evansville, Ind., Paducah, Ky., and Portsmouth, Ohio, and to require reports covering traffic which is routed through either of these gateways, or which may be held for either of them on account of congestion. They will give particular attention to the handling of freight for the government, recommending any measures which will facilitate its movement. The committee will decide upon all embargoes affecting traffic passing through these gateways, their extent and duration, placing same through the regional directors, and keeping the Car Service Section constantly and fully advised. They are expected to study the traffic passing these gateways, with the view of detecting and remedying any movements which are out of line or proper route, conferring freely with the Divisions of Traffic and Operation, including the Car Service Section.

Pocahontas Regional Purchasing Committee

N. D. Maher, regional director of the Pocahontas district, has announced the appointment of a Regional Purchasing Committee, consisting of E. T. Burnett, purchasing agent of the Norfolk & Western, as chairman, and B. T. Jellison, purchasing agent of the Chesapeake & Ohio. The committee will have its office at Roanoke, Va.

Board of Adjustment No. 2

In conformity with the provisions of General Order No. 29, Railway Board of Adjustment No. 2 has been constituted as follows: W. H. Penrith, assistant general manager, Chicago & Alton; E. F. Potter, assistant to general manager, Soo Line; A. C. Adams, superintendent of shops, New York, New Haven & Hartford; E. A. Sweeley, master car builder, Seaboard Air Line; W. F. Kaderly, general superintendent, Georgia Southern & Florida; Robt. J. Turnbull, inspector of transportation, Atlantic Coast Line; H. J. Carr, International Association of Machinists; George W. Pring, International Brotherhood of Boiler Makers, Iron Ship Builders & Helpers of America; G. C. Van Dornes, International Brotherhood of Blacksmiths & Helpers; F. H. Knight, Brotherhood Railway Carmen of America; Otto E. Hoard, Sheet Metal Workers' International Alliance; and F. J. McNulty, International Brotherhood of Electrical Workers.

The board will meet shortly to elect a chairman and vice-chairman and organize for business as provided in General Order No. 29. A circular will be issued giving notice when the board is ready to perform the duties entrusted to it.

Express Contract Held Up

The proposed contract between the Railroad Administration and the express companies has struck several snags in the office of the attorney general, where it has been under consideration for several days, although it is understood that the snags were discovered by the postmaster general before the document was referred to the Department of Justice. The postmaster general, possibly mindful of the competition which his department might experience at the hands of a unified express company after the war, is said to have raised a question at a cabinet meeting as to whether the proposed merger of the express companies if allowed to continue after the war, would not constitute a violation of the Sherman law. The attorney general, to whom the contract was then referred, insisted that it be rewritten to remove what he held to be a guarantee against prosecution under the anti-trust law and to provide for the complete unscrambling of the merger after the war by the return of the property to the owning express companies. A conference on the subject was held on Tuesday between Director Prouty of the division of public service and accounting and General Counsel Payne, representing the Railroad Administration, and Attorney General Gregory and his assistant G. C. Todd, after which Messrs. Payne and Prouty held a further conference with the representatives of the express companies.

Transportation Conditions in Eastern Territory

The Railroad Administration has given out a report submitted to Director General McAdoo on May 29 by A. H. Smith, eastern regional director, regarding transportation conditions in his territory since January. The report in part follows:

The chaotic conditions into which the railroads in this territory got during the severe winter months have been straightened out with promptness and the recovery is at this time such as to enable me to report to you an almost normal situation in the movement of traffic, and also the fact that the railroads in this territory are now in such order as to make possible the movement of considerable additional tonnage if offered. Perhaps the greatest congestion existed in the territory of Pennsylvania, Maryland, and West Virginia, served more particularly by the Pennsylvania, Baltimore & Ohio, and Philadelphia & Reading. On February 6 the Pennsylvania reported 27,588 cars above normal for movement; today the number so reported is 3,532, and these are held because consignees are unable to accept. The Baltimore & Ohio at its worst on February 6 had 21,415 cars above normal; today there are 1,348. In the entire territory of the Eastern District there were on February 6, 161,000 cars above normal; today the total is 16,891 and these are widely distributed. An acute car shortage prevailed all during the winter. At the present there is no shortage of closed cars and practically a full supply of open cars. With the better weather the physical condition of motive power has been improved and passenger trains are operating more punctually.

The factors which impaired railroad operation so seriously during the winter months were: First, the unusually severe weather; low temperature, and storms, one following another so closely as to make it impossible to recover in the interim. Second, the shortage of motive power due to failure to receive locomotives ordered in 1916 and 1917 for use during the past winter. The necessity for these locomotives was anticipated and the orders placed with builders, but the priority which it was necessary to exercise in building locomotives for service abroad made it impossible to deliver. Third, the acute labor shortage.

Since January 1 there have been many measures adopted for efficient operation, among which may be mentioned:

1. The elimination of approximately 2,200,000 miles per month of unessential passenger train mileage.

2. The assignment to the eastern railroads of 122 locomotives constructed for the United States military railways in France; also 125 locomotives constructed for the Russian government, as well as 118 locomotives under order for the southern and western roads.

3. The transfer of power from one road to another to relieve congestion or shortage of power. All roads are required to report surplus equipment and it is distributed wherever the need for it appears. On May 21, 215 locomotives belonging to eastern railroads were rented on this basis to other roads in the eastern territory.

4. Diversion of traffic to less congested routes and the expedited movement of empty box, refrigerator and stock cars westbound and empty coal cars to mines via most available routes, regardless of loaded haul.

5. Handling company fuel and material by most direct routes, saving unnecessary haulage, which under private control was sometimes done to give the greatest proportion of a through rate to the receiving line.

6. The common use of terminal facilities at large commercial centers.

7. The interchange of labor to eliminate accumulations of l. c. l. freight.

8. Restriction on available equipment for certain classes of loading, which has been possible under unified control, permitting the urgently required traffic to be loaded and moved to the exclusion of less necessary commodities.

9. The classification of freight by the originating railroads to permit trains to be run through to Western termini without re-switching.

10. The co-ordination of harbor facilities at New York, in order that the greatest possible service could be obtained from the floating equipment and facilities; including the breaking of ice in the bays, rivers and slips during the periods of low temperature, to permit the operation of marine equipment.

11. Institution of "sailing days" in the handling of l. c. l. freight. In a very large number of instances regular cars previously loaded daily are now forwarded but three times a week, which is resulting in a decrease of 50 per cent in the number of cars used and a consequent increase of 100 per cent in the tonnage per car handled.

12. The routing of freight to tidewater via the delivering line at destination has resulted in a very great relief to the seaboard terminal facilities; all freight for Staten Island now being routed so far as possible Baltimore & Ohio; freight for the Bronx, New York Central; freight for Bayonne and Constable Hook via the Lehigh Valley, etc. Furthermore, arrangements were made for the loading of freight to steamers direct from the piers, the freight being routed via the line reaching the pier, which resulted in great economy in the use of terminal and marine facilities. There has also been a considerable volume of freight diverted to other ports to relieve the New York export situation.

13. The saving in power account diversion of traffic to roads with most favorable grades, resulting in saving of engine efficiency.

Map Showing the Three New Regions in the West

14. The facilities of the eastern railroads' locomotive and car repair shops are being constantly scrutinized in an endeavor to find space for repairing locomotives of other eastern railroads not so well situated, and to date 98 eastern railroad locomotives have been repaired and 28 additional are undergoing repairs at shops other than those of the owning lines. In addition, arrangements have been made with the western railroads for the repair of 66 eastern lines' locomotives, 22 of which are at present in western shops undergoing repairs.

15. The running of locomotives through over more than one road in connection with troop and freight movement to save power and the delay to traffic.

16. The movement of anthracite coal and empty equipment through the Pennsylvania tubes.

17. The placing of coal on team tracks, New York City, for unloading to relieve the coal shortage.

18. The diversion of bituminous coal to piers of New York harbor where it could be dumped most expeditiously to relieve the need of bunker coal for ships waiting in New York harbor.

On February 1 blast furnace production was 57 per cent of capacity, and by-product coke 67 per cent. At that time 113 out of 290 blast furnaces were out of blast. At the present time the blast furnace situation is practically normal, there being no furnaces out of blast because of lack of transportation, those which are not in operation being out for repairs. The American Iron & Steel Institute report furnaces now in operation which have been out of blast during the past three or four years so that it may be said that steel and iron production is at this time not impaired because of lack of transportation service.

The movement of coal via the Great Lakes is progressing satisfactorily, there being an increase of 26 per cent in cars dumped in vessels so far this season. The ore movement from the Lakes is also ahead of last year to the extent of four per cent in cars shipped.

During the winter months steel tonnage piled at the plants awaiting shipment continued to increase, and reached the peak about March 1, at which time there were approximately 500,000 tons awaiting movement due to embargoes and lack of cars. This tonnage has been moved with the exception of about 40,000 tons which is held account of embargo.

With the improvement of the weather and the coal car supply, there has come an increase in the bituminous coal loaded; the average figures for January showing 15,639 cars loaded per day, and for the first 25 days of May, an average of 19,726 cars. In January an average of 5,713 cars of anthracite coal were loaded per working day, which has increased to 6,583 cars in May.

The average anthracite coal dumped at tidewater ports in January per calendar day was 820 cars; in May 1,109. Bituminous coal dumped in January, all ports, was 1,403 cars per day, and in May 2,236. The average daily movement of anthracite coal into New England in February was 463 cars per working day; in May 617; while the bituminous movement into New England in February was 331 cars per day; and in May 492.

On January 1 there were on hand at North Atlantic ports approximately 41,000 cars of export freight in cars, on piers, and on the ground. This has been reduced to approximately 28,000 cars. This improvement has been brought about by the permit system of control based upon steamship requirements, or what is known as the consignee basis of regulation of shipments. It has resulted in eliminating all complaint of delay to ships awaiting cargo.

The discontinuance of fast freight service made it necessary to establish continuous movement service for handling export traffic from the Central West and West to the East. The export delivered steamships shows a progressive increase. In March it averaged 940 cars per calendar day; while in May the average is 1,172 cars per day.

The overseas tonnage of United States government freight is increasing by leaps and bounds, due to the heavy troop movement, and, with the mutually co-operative measures being taken with the war department for its regulation, is moving without interruption and on an entirely satisfactory basis.

Director General McAdoo has telegraphed a reply, saying in part: "It is a record of railroad achievement of the highest order in the face of difficulties of unprecedented character. I congratulate you and the officers and men under you for the loyal and effective service they have rendered to their country in bringing the railroads in the eastern territory up to such a high standard of operation in so short a time. We railroad men have been given a big part of the responsibility for licking something spelled with four letters out of the Kaiser and his military gang. It is a rare privilege and what you have already done shows that we are going to do our share of the job to Uncle Sam's taste. Keep up the good work."

More Time Wanted to Decide Status of Short Lines

At the request of Director General McAdoo, a joint resolution has been introduced in the House and Senate to extend the time within which the President may relinquish control of any railroad, as provided in section 14 of the railroad control act, from July 1 to January 1, 1919. John Barton Payne, general counsel for the Railroad Administration, who transmitted the request, said that a plan for dealing with the short lines would be agreed upon eventually but that it had been found impossible to do so within the time allowed by the act.

Answering a Senate resolution introduced by Senator Cummins directing him to furnish information as to the contracts between the government and the railroads for compensation, Director General McAdoo has sent a communication saying that no contract has yet been executed with any carrier, and none has refused to execute a contract. Upon the approval of the federal control act, the question of agreeing upon a standard form of contract between the government and the carriers was taken up, the government being represented by Messrs. Clark, Meyer, Hall, and Anderson, members of the Interstate Commerce Commission; Judge Prouty, director of public service and accounting of the Railroad Administration; Nathan Matthews, of Boston, employed as special assistant to the general counsel; and John Barton Payne, general counsel; and the carriers being represented by their counsel. No conclusion of these discussions has yet been reached.

Representatives of the short lines at a hearing before the House Committee on Interstate Commerce, held to consider the resolution on June 15 and 17, urged that the resolution be amended to provide that no short line shall be released unless competing roads are released at the same time. John Barton Payne represented the administration in urging the passage of the resolution.

Negotiations in the form of contract are still progressing but with every indication that it will be a long time before any agreement will be reached.

Director General McAdoo Away for a Rest

Director General McAdoo, who left Washington June 12 for White Sulphur Springs, where it was announced he would spend a large part of the summer, left again on Saturday, without his destination being announced, to rest and recuperate, at the orders of his physician, in some place where he will not be disturbed by callers, telegrams or telephone calls. Mr. McAdoo has been under a heavy burden and needs a rest. It is given out that his poor health is solely the result of his recent attack of laryngitis, which has affected his vocal cords and made it difficult for him to speak and has caused him difficulty for some time.

Waterway Advocates Busy

A large delegation of waterway advocates from St. Louis and the Mississippi valley, including a number of congressmen, held a conference at Washington on June 17 with Director Prouty of the Division of Public Service and Accounting, as Mr. McAdoo's representative, to urge the Railroad Administration to inaugurate a barge service on the Mississippi river from St. Louis to New Orleans at an expenditure of between $7,000,000 and $8,000,000. The arrival of the committee in Washington was heralded by the insertion in the Washington papers of an advertisement directed to Director General McAdoo in the form of a two-column editorial from the St. Louis Post-Dispatch, charging that the railroad officers on the director general's staff and others on whom he has called for advice have "smothered" a recommendation of the

Inland and Coastwise Waterways Committee in favor of the establishment of the barge service. It was stated that the committee appointed by Mr. McAdoo to investigate the use of waterways has recommended a barge service which could be provided at an expenditure of $7,350,000 to carry 1,080,000 tons of freight per year and return net earnings of $1,526,000, or 18 per cent on the investment, and that the committee had also recommended the establishment of a barge service on the New York State Barge Canal, which has been put into effect, but that the report of the committee as to the Mississippi river was referred by Mr. McAdoo's railroad assistants to a committee consisting of John Howe Peyton, president of the Nashville, Chattanooga & St. Louis; Frank B. Bowes, vice-president of the Illinois Central, and F. C Reilly, freight traffic manager of the St. Louis-San Francisco, who rejected the recommendation for the use of the Mississippi river.

At the office of the Railroad Administration it was stated that the reports both of the waterways committee and of the railroad committee were merely advisory reports for the benefit of the director general and that no decision had been reached.

Interpretations of Wage Order

At the request of the executive officers of the four brotherhoods of train service employees, who conferred with Mr. McAdoo on June 12, the director general has issued two formal interpretations of General Order No. 27 increasing the wages of railroad employees. Interpretation No. 1 approved a recommendation of Railroad Board of Adjustment No. 1, to which had been referred a communication from the brotherhood executives asking for a construction of the order in so far as it relates to the bases of pay for yard engineers, firemen, conductors or foremen and brakemen or helpers. The board's recommendation states that as these classes of employees had a guaranteed minimum day's pay, irrespective of how expressed in schedules, the increases granted by the order should be applied to such employees upon the guaranteed minimum day's pay of December, 1915, and that, therefore, their increases should be computed upon the table given in Section B of Article 2 of the order, which is a scale of wages for employees paid upon a daily basis.

Interpretation No. 2 states that the following bases will be observed in the application of rates of pay in General Order No. 27:

All persons employed in any capacity, and receiving less than $250 per month in salary, will receive the increases named in the director general's General Order No. 27, unless specifically excluded therein.

Passenger Service.—All conductors, baggagemen, flagmen and brakemen paid on the mileage basis and performing more than the minimum daily mileage will be paid under the provisions of Section E, Article 2.

All conductors, assistant conductors, ticket collectors, baggagemen, flagmen and brakemen paid under the monthly guarantee of the Eastern and Southeastern Territory, will be paid under the provisions of Section A, Article 2, and the daily rate will be 1/30 of the monthly rate.

All conductors, baggagemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Local Freight Service.—All conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Local freight conductors, engineers, firemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Through Freight Service.—Conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Conductors, engineers, firemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Work Trains.—Conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Conductors, engineers, firemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Specified Trip Rates.—In passenger, through freight or local freight, the increases in trip rates shall take the percentages applicable to each class of service respectively.

Special Allowances.—All arbitrary or special allowances, previously paid on the hourly basis, will be paid at the new hourly rate.

Arbitraries or special allowances, previously paid on the basis of mileage, will be paid on the new mileage rates.

If the schedule amount bears no relation to miles or hours, such arbitrary or special allowances will be increased in accordance with the percentage shown under Section E, Article 2.

Engines which have come into the service since 1915, on which rates have been applied—for the purpose of computation under General Order No. 27, consider such rates as being applicable December 31, 1915, and apply appropriate increases from January 1, 1918.

The negotiated rate since the Arbitration of the Engineers and Firemen in the East and West, for transfer service—for example, the $4.50 rate for engineers and the $3 rate for firemen in the Western territory shall be increased under Section B of Article 2. Where through freight rates apply to transfer service, the increases under Section E, Article 2, will apply.

Where the guaranteed daily minimum is an arbitrary rate, and is not based on hours or miles, engineers and firemen will be paid the rate under the provisions of Section B, Article 2, Where the guaranteed minimum is based on mileage, engineers and firemen shall be paid the rate under the provisions of Section E, Article 2.

Hostlers.—The rates in Section B, Article 2, shall apply to hostlers, based upon rates in effect December, 1915.

Auditor for the Railroad Administration

J. W. Roberts, who has been appointed auditor of the Railroad Administration, as reported in last week's issue, has been auditor for the Bureau of Valuation of the Interstate Commerce Commission. His duties are to audit the accounts of the Railroad Administration and those between the administration and outside enterprises, such as the express companies, and the railroad and steamship corporations. It is expected that after the question of the railroads' compensation is settled he will have a large force of field assistants.

Car Service Section Has Chicago Office

W. L. Barnes, assistant manager of the Car Service Section, has been transferred to Chicago, where he will have charge of matters pertaining to the use of tank and refrigerator cars.

REMEMBER THAT NATIONAL WAR SAVINGS DAY IS JUNE 28.—Pledge yourself on or before that day to save to the utmost of your ability and to buy War Savings Stamps that there may be more money, labor and materials to back up those who fight and die for you.

TO AID RUSSIAN RAILWAYS.—Press despatches from Moscow, dated May 17, state that Col. George H. Emerson, with eight members of the Railroad Mission headed by John F. Stevens, which has been in Russia for the last year, is on his way to Bologda from Vladivostok at the request of David R. Francis, American Ambassador to Russia. The purpose is a conference on the possibilities of an improvement in the railway situation in Russia.

Officers Required for Railway Troops

S. M. FELTON, director-general of military railways has issued a new call for railway men for service on the American lines of communication overseas.

With the growth of our armies in France many additional officers for railroad troops that are now forming and which will be formed in the near future will be required. The director general military railways realizes the necessity of retaining American railroad officers in their present positions and that the operation of the American railroads must be maintained, but there is such necessity for officers for railway troops in France that he is calling for *experienced railroad men who are now employed in other active pursuits.* He has requested that railroad officers send to him the names of their acquaintances who would be possible candidates under this ruling.

The following statement gives an outline of the qualifications required; the official rank for which commissions will be issued, with their several rates of pay; the commutation for quarters being allowed when officers are maintaining their families in this country:

		Rate of pay			Total	
Qualification	Rank	U. S.	Foreign	Commutation of quarters	U. S.	Foreign
Asst. general manager	Major	$3,000	$3,300	$720	$3,720	$4,020
General superintendents	Major	3,000	3,300	720	3,720	4,020
Superintendents—Motive power	Major	3,000	3,300	720	3,720	4,020
Division superintendents	Captain	2,400	2,640	576	2,976	3,216
Master mechanics	Captain	2,400	2,640	576	2,976	3,216
Engrs. maintenance of way	Captain	2,400	2,640	576	2,976	3,216
Trainmasters	1st Lt.	2,000	2,200	432	2,432	2,632
Div. engrs.—maintenance of way	1st Lt.	2,000	2,200	432	2,432	2,632
Chief despatchers	1st Lt.	2,000	2,200	432	2,432	2,632
Road foremen of engines	1st Lt.	2,000	2,200	432	2,432	2,632
General yardmasters	1st Lt.	2,000	2,200	432	2,432	2,632
Enginehouse and shop foreman	1st Lt.	2,000	2,200	432	2,432	2,632
Asst. division engineers	2nd Lt.	1,700	1,870	288	1,988	2,158
Yardmasters	2nd Lt.	1,700	1,870	288	1,988	2,158
Supervisors and roadmasters	2nd Lt.	1,700	1,870	288	1,988	2,158
Asst. enginehouse and shop foremen	2nd Lt.	1,700	1,870	288	1,988	2,158

In addition to the above there is a small allowance made for heat and light which varies according to the location of station and season of the year.

It is desired that as many men as possible communicate with the Director General Military Railways' office, 6th & B streets, N. W., Washington, D. C., and that in these communications they give in detail their railroad experience and their references. The call for these men is pressing and it is hoped that there will be a hearty response.

Orders of the Southern Regional Director

IN CIRCULAR LETTER No. 252 issued by B. L. Winchell, regional director for the Southern lines, the jurisdiction of the Southern Passenger Committee is extended over union depot ticket offices and it is instructed to determine whether the ticket selling force and the Information Bureau in any union depot ticket office is adequate and competent satisfactorily to conduct the business of the office and serve the public; to determine whether the salaries paid the ticket agents and other employees in said offices are sufficient to secure and retain competent men and to fix said salaries; and to determine whether the physical facilities at such offices are sufficient or are best arranged for prompt and satisfactory service to the public, and to suggest to the carriers operating the office such changes and alterations as are deemed necessary to improve conditions.

Circular No. 252 issued by G. R. Loyall, assistant regional director, states that the Railroad Administration does not approve the practice of permitting persons known as "live tracers" to accompany shipments of freight, including government freight, and, unless specifically provided for in published tariffs, no person shall be permitted to accompany freight shipments in transit or to have access to railroad yards and property for so-called purpose of locating and expediting movement of a particular class or individual cars of freight. Similar instructions have been issued by other regional directors.

Circular No. 256, issued by Regional Director B. L. Winchell, asks the railroads to advise what measures have been taken to deal with the embargo situation to the end that all shippers may readily procure accurate information and as to what plan is being pursued whereby the various headquarters and division officers keep themselves informed of prospective shipments with a view of getting them forwarded as soon as embargoes against given destinations or sections may be lifted. The regional director particularly wants to know how the railroads deal with the situation as concerns shippers at points at which the railroads have no resident officers or traffic department representatives.

Freight Operations of Steam Railways for 1915, 1916 and 1917

THE BUREAU OF RAILWAY ECONOMICS has made the following compilations for the American Railway Association, giving the comparative summary of freight operations for the calendar years 1915, 1916 and 1917:

UNITED STATES

Item	Year ended December 31— 1917	1916	1915	Per cent of inc. or dec. 1917 compared with— 1916	1915
Freight train-miles	653,932,568	641,202,142	572,305,829	2.0	14.3
Loaded freight car-miles	15,765,599,155	15,732,077,674	13,649,285,729	0.2	15.5
Empty freight car-miles	6,691,111,173	6,694,542,195	6,696,582,974	d 0.1	d 0.1
Total freight car-miles—loaded and empty	22,456,710,268	22,426,619,869	20,345,868,703	0.1	10.4
Freight locomotive-miles	751,820,895	732,837,255	662,526,273	2.6	13.5
Revenue ton-miles	89,168,754,904	357,670,566,671	298,184,700,418	8.8	30.5
Non-revenue ton-miles	35,250,206,588	33,374,423,961	30,319,094,371	5.6	16.3
Average number of freight locomotives in service	30,805	30,555	29,834	0.8	3.3
Average number of freight locomotives in shop or awaiting shop	4,385	4,726	5,096	d 7.2	d 14.0
Average number of freight cars in service	2,330,000	2,275,092	2,283,986	2.4	2.0
Average number of freight cars in shop or awaiting shop	131,760	139,747	204,556	d 5.7	d 35.6
Home	99,874	111,942	186,105	d 10.8	d 46.3
Foreign	31,886	27,805	18,451	14.7	72.8
Tons per train	649	610	574	6.4	13.1
Tons per loaded car	26.9	24.9	24.1	8.0	11.6
Average miles per locomotive per day	66.9	65.5	60.8	2.1	10.0
Average miles per car per day	26.4	26.9	24.4	d 1.9	8.2
Per cent of empty car-miles	29.8	29.9	32.9	d 0.3	d 9.4
Per cent of freight locomotives in shop or awaiting shop	14.2	15.5	17.1	d 8.4	d 17.0
Per cent of freight cars in shop or awaiting shop	5.7	6.1	9.0	d 6.6	d 36.7
Revenue ton-miles:					
Per freight locomotive	12,636,545	11,705,795	9,994,795	8.0	26.4
Per freight car	167,068	157,211	130,555	6.3	28.0
Average miles operated—single track	227,566.98	227,687.93	225,627.08	d 0.6	0.9

EASTERN DISTRICT

Item	Year ended December 31— 1917	1916	1915	Per cent of inc. or dec. 1917 compared with— 1916	1915
Freight train-miles	263,019,862	268,958,836	240,315,104	d 2.2	9.4
Loaded freight car-miles	6,799,074,102	7,029,058,240	6,190,754,471	d 3.3	9.8
Empty freight car-miles	3,030,441,031	3,215,987,485	3,241,589,306	d 5.8	d 6.5
Total freight car-miles—loaded and empty	9,829,515,133	10,245,045,725	9,432,343,777	d 4.1	4.2
Freight locomotive-miles	320,395,435	323,998,477	293,770,657	d 1.1	9.1
Revenue ton-miles	85,684,192,976	175,668,553,963	151,144,522,875	5.7	22.9
Non-revenue ton-miles	11,138,891,476	10,247,506,138	9,585,228,838	8.7	16.2
Average number of freight locomotives in service	12,854	12,845	12,127	0.1	6.0
Average number of freight locomotives in shop or awaiting shop	1,933	2,033	2,230	d 4.9	d 13.3
Average number of freight cars in service	1,214,146	1,192,957	1,134,818	1.8	7.0
Average number of freight cars in shop or awaiting shop	71,814	74,886	113,853	d 4.1	d 36.9
Home	54,048	59,521	105,154	d 9.2	d 48.6
Foreign	17,766	15,365	8,699	15.6	104.2
Tons per train	748	691	669	8.2	11.8
Tons per loaded car	28.9	26.4	26.0	9.5	11.2
Average miles per locomotive per day	68.3	68.9	66.4	d 0.9	2.9
Average miles per car per day	22.2	23.5	22.8	d 5.5	d 2.6
Per cent of empty car-miles	30.8	31.4	34.4	d 1.9	d 10.5
Per cent of freight locomotives in shop or awaiting shop	15.1	15.8	18.4	d 4.4	d 17.9
Per cent of freight cars in shop or awaiting shop	5.9	6.3	10.0	d 6.3	d 41.0
Revenue ton-miles:					
Per freight locomotive	14,445,635	13,676,026	12,463,472	5.6	15.9
Per freight car	152,935	147,255	133,188	3.9	14.8
Average miles operated—single track	57,865.22	58,066.04	58,321.30	d 0.3	d 0.8

SOUTHERN DISTRICT

Item	Year ended December 31— 1917	1916	1915	Per cent of inc. or dec. 1917 compared with— 1916	1915
Freight train-miles	119,048,767	111,839,174	104,121,345	6.4	14.3
Loaded freight car-miles	2,674,851,865	2,596,596,561	2,288,491,537	3.0	16.9
Empty freight car-miles	1,234,989,678	1,165,921,614	1,170,259,191	5.9	5.5
Total freight car-miles—loaded and empty	3,909,841,543	3,762,518,175	3,458,750,728	3.9	13.0
Freight locomotive-miles	131,422,559	123,734,335	115,653,768	6.2	13.6
Revenue ton-miles	67,740,363,608	61,130,697,904	51,408,086,725	10.8	31.8
Non-revenue ton-miles	6,452,988,863	5,890,853,737	5,183,703,041	9.5	24.5
Average number of freight locomotives in service	5,449	5,367	5,328	1.5	2.3
Average number of freight locomotives in shop or awaiting shop	683	698	768	d 2.2	d 11.1
Average number of freight cars in service	319,156	319,113	363,975	0.1	d 12.3
Average number of freight cars in shop or awaiting shop	16,541	19,903	32,894	d 16.9	d 49.7
Home	12,675	16,640	30,414	d 23.8	d 58.3
Foreign	3,866	3,263	2,480	18.5	55.9
Tons per train	623	599	544	4.0	14.5
Tons per loaded car	27.7	25.8	24.7	7.4	12.1
Average miles per locomotive per day	66.1	63.0	59.5	4.9	11.1
Average miles per car per day	33.6	32.2	26.0	4.3	29.2
Per cent of empty car-miles	31.6	31.0	33.8	1.9	d 6.5
Per cent of freight locomotives in shop or awaiting shop	12.5	13.0	14.4	d 3.8	d 13.2
Per cent of freight cars in shop or awaiting shop	5.2	6.2	9.0	d 16.1	d 42.2
Revenue ton-miles:					
Per freight locomotive	12,450,058	11,390,106	9,648,665	9.3	29.0
Per freight car	212,562	191,564	141,241	11.0	50.5
Average miles operated—single track	42,221.11	42,076.40	41,704.98	0.3	1.2

WESTERN DISTRICT

Item	Year ended December 31— 1917	1916	1915	Per cent of inc. or dec. 1917 compared with— 1916	1915
Freight train-miles	271,863,939	260,404,132	227,869,380	4.4	19.3
Loaded freight car-miles	6,291,673,188	6,106,422,873	5,170,039,721	3.0	21.7
Empty freight car-miles	2,425,680,404	2,312,633,096	2,284,734,477	4.9	6.2
Total freight car-miles—loaded and empty	8,717,353,592	8,419,055,969	7,454,774,198	3.5	16.9
Freight locomotive-miles	300,002,901	285,104,443	253,101,848	5.2	18.5
Revenue ton-miles	135,744,198,320	120,871,314,804	95,632,090,818	12.3	41.9
Non-revenue ton-miles	17,658,330,249	17,236,064,086	15,550,162,492	2.4	13.6
Average number of freight locomotives in service	12,502	12,343	12,379	1.3	1.0
Average number of freight locomotives in shop or awaiting shop	1,759	1,995	2,098	d 11.8	d 16.2
Average number of freight cars in service	796,706	763,022	785,193	4.4	1.5
Average number of freight cars in shop or awaiting shop	43,405	44,958	57,809	d 3.5	d 24.9
Home	33,151	35,781	50,537	d 7.4	d 34.4
Foreign	10,254	9,177	7,272	11.7	41.0
Tons per train	564	530	488	6.4	15.6
Tons per loaded car	24.4	22.6	21.5	8.0	13.5
Average miles per locomotive per day	65.7	63.1	56.0	4.1	17.3
Average miles per car per day	30.0	30.1	26.0	d 0.3	15.4
Per cent of empty car-miles	27.8	27.5	30.6	1.1	d 9.2
Per cent of freight locomotives in shop or awaiting shop	14.1	16.2	16.9	d 13.0	d 16.6
Per cent of freight cars in shop or awaiting shop	5.4	5.9	7.4	d 8.5	d 27.0
Revenue ton-miles:					
Per freight locomotive	10,857,799	9,792,701	7,725,349	10.9	40.5
Per freight car	170.382	158,411	121.794	7.6	39.9
Average miles operated—single track	127,470.65	127,545.49	125,600.80	d 0.1	1.5

d Decrease.

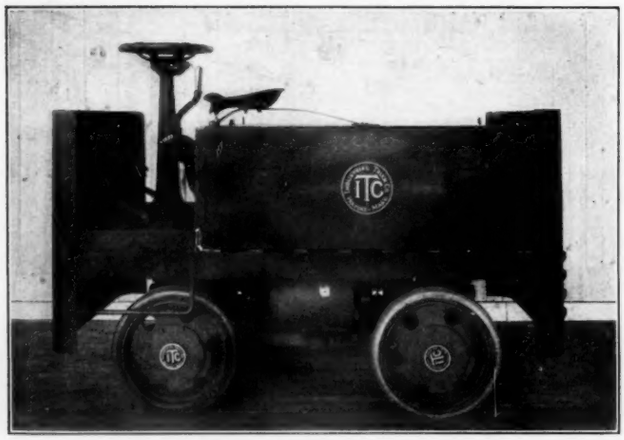
ASK POOR TO QUIT PARIS.—Press despatches state that measures have been taken by the French Ministry of Public Works to facilitate the departure of poor families from Paris. This step is not taken because it is considered imminent danger is threatening the capital but from the wish to aid people of modest means to avoid the difficulties due to the crowded conditions at the railroad stations recently. Beginning with Sunday, June 23, family tickets for third class passage will be delivered by all railroads. The first member of a family paying full rate and the others half fare. The minimum distance for a new destination is 160 miles. The tickets will only be delivered to families whose annual rent does not exceed $120 with 20 more for each member of a family consisting of more than two persons.

THE LONDON, BRIGHTON & SOUTH COAST has issued the 17th edition of its Roll of Honor containing the names of men who have died on active service, and the number and percentage of men enlisted. The total number of men enlisted is 4,896, which is 30 per cent of the total employed, while 355 of this number have died on active service, which is 7.25 per cent of the men enlisted.

Storage Battery Trucks, Tractors and Locomotives

THERE ARE FOUR DISTINCT TYPES of machines made by the Industrial Truck Co., Holyoke, Mass. These are a tractor, two types of load-carrying trucks, an elevating platform type truck and a locomotive with flanged wheels for running on rails. The first four types mentioned are equipped with hard rubber tires. A distinguishing feature of this line of equipment is that the greater number of parts in any one machine are interchangeable with the corresponding parts in any other.

The tractors are manufactured in two types, namely, an end control and a center control tractor. A tractor with end control is shown in the illustration. The difference in arrangement on the center control truck is that the operator sits in the center and can by changing seats operate in either direction without having to turn his tractor around. In congested or narrow aisles this is often a very valuable feature. Either



Storage Battery Tractor

type steer on all four wheels and are built as two or four wheel drives. The two-wheel drive machine can be converted to a four-wheel drive by the owner by purchasing the necessary worm and wheel housings, differential, etc.

The frame is built up of commercial rolled channel section steel and the bumper plates are of heavy boiler plate bent at the corners and riveted to the frame. Coupler castings are of the three-step type which makes it possible to use trailers of various heights.

The battery boxes are constructed with easily removable side doors for changing batteries and with a hinged top plate for easy access for flushing or inspection. Any type of battery can be supplied up to a maximum of 42 cells of the A-8 type Edison battery or 24 cells of a lead battery with 21 plates per cell. The removal of four nuts makes it possible to lift the frame and battery box from the chassis, leaving the entire driving mechanism accessible for inspection and repairs.

Power is transmitted from the motor through a single reduction worm and gear down through a differential to the wheel by means of a rugged universal joint capable of operating at an angle of 43 degrees. This universal joint is enclosed in a patented dust and oil-proof case formed by the pivoting wheel knuckle and its supporting yoke.

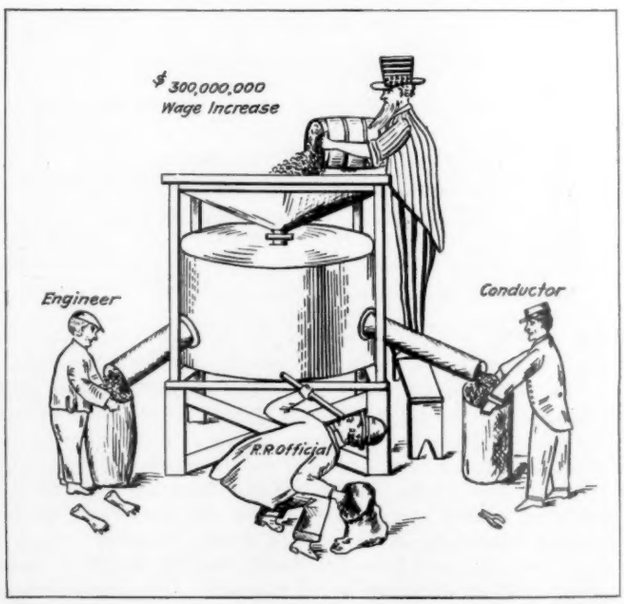
Wheel bearings are a high grade type of ball bearing and are considerably oversized to permit the universal joint to be drawn out through the full floating mounting of the wheel. The pivot bearings are of such a size that it is easier to steer the tractor than it is to steer the average pleasure car.

Two separate brakes are provided. The emergency brake is operated by the left foot and the service brake by the right. To operate the tractor the operator must be sitting in the seat with his left foot pressing the emergency brake pedal down. If his left foot is lifted from the brake pedal the brake is applied and a clutch on the controller shaft throws the controller handle out of gear and the controller into neutral position. It is then impossibe to start the machine again without first releasing the emergency brake and bringing the controller handle back to the neutral position. The electric horn is operated by a push button in the controller handle. An additional safety feature is found in the tilting steering wheel. This wheel is so located that the operator must tilt the wheel in order to leave his seat. This tilting arrangement is interlocked with the controller shaft clutch so that under no circumstances can the power be applied until the steering wheel is in the running position.

The locomotives are heavy and substantial machines built for any practical gage from 24 in. to the standard gage of 56½ in. Except for the absence of differentials, universal joint drive mechanism and steering mechanism and the substitution of flanged steel wheels for rubber tired ones, the locomotives contain all of the features described for the tractors. They are adapted for use in factories, warehouses, munition plants, depots, freight terminals, mines, etc. Practically all of the parts are interchangeable with those of the trucks and tractors.

The load carrying Type "L" truck and elevating platform type "E L" truck are of 4,000 lb. capacity. Each of the trucks has exactly the same power parts and with the exception of the motors all parts are interchangeable with those of the tractor. With a fleet of trucks and tractors of this type it would be necessary to keep on hand only one additional power unit to keep the fleet secure against loss due to accident or breakdown. The elevating mechanism on the type "E L" truck will lift its rated load of 4,000 lb. to a height of 5 in. and is operated by a hydraulic ram which in turn is connected through its pump to a small motor. A unique feature of this mechanism is that it requires no expenditure of current in lowering the load which means an appreciable saving.

Ball, radial and thrust bearings are used throughout, hardened pins in the renewable bushing are provided for all joints, and lubrication is taken care of by means of grease cups of the ratchet type.



Anonymous

Stopped Up

Concrete Caissons Sunk by Open Dredging Method*

Development of This Form of Foundation from Simple Boxes to Cylinders Driven to Great Depths

By L. W. Skov
Assistant Engineer Bridge Department, Chicago, Burlington & Quincy, Chicago, Ill.

IN THE CONSTRUCTION of ordinary railroad bridges, it is quite frequently necessary to put the footings a considerable distance below the ground line or the bed of the stream to obtain a good foundation or to eliminate danger from scour. It is in foundation work of this kind that the concrete caisson sunk by the open method of excavation has its field. By the selection of the proper design, concrete caissons sunk by this method can be built to cover a large variation of soil and sinking conditions, as the caisson can either be built complete over its final location before the sinking operations start, or it can be partly built, sinking started and additional sections of concrete added from time to time as the sinking progresses. If the location of the pier is in the wet part of the channel, the caisson will be built on temporary staging and lowered to position on the bed of the stream by means of lowering screws or built on an artificial island.

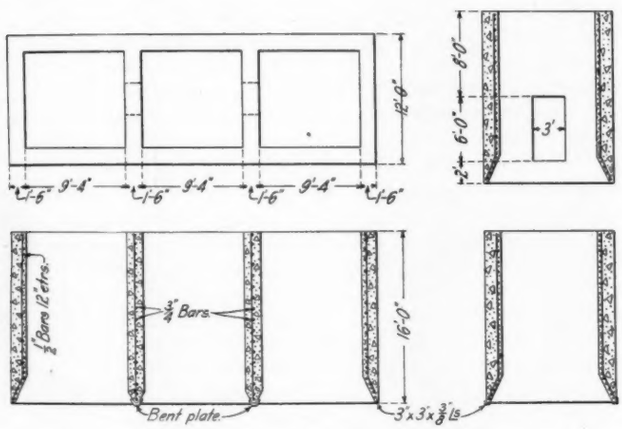


Fig. 1—An Early Type of Caisson

Some of the reasons for the use of the concrete caisson are: (1) The elimination of wooden or steel sheet pile cofferdams, which must necessarily be made larger than the neat dimensions of the footing, to allow room for wales and bracing. (2) The walls of the concrete caisson are practically impervious to water. (3) The finished structure is one solid piece of concrete, no timbers being imbedded in it, as would be the case where a construction requiring interior bracing is used. (4) The amount of timber required for forms for a concrete caisson is very much less than that required for building cofferdams. This, of course, is a very great advantage at the present time, as the government has reserved all of the larger sizes of timber for shipbuilding and other government construction activities. (5) The amount of equipment required is reduced, inasmuch as it eliminates the use of sheet pile driving equipment, and allows a reduction in pumping equipment. (6) Eliminates the pulling of sheet piling, where the leaving in place of the sheet piling is objectionable. (7) Saves time in construction, as it is not necessary to first drive a cofferdam.

* Abstracted from a paper presented before the Western Society of Engineers, June 10, 1918.

Design and Construction

The walls of the caissons are designed for a variable unit load equal to that usually used in designing walls retaining an earth fill. In cases where a considerable head of water is expected the hydrostatic pressure is added to the above unit pressure. The bottoms of the sidewalls and interior struts are tapered down to a width of from 3 in. to 1 ft. on the bottom, to form a cutting edge. Where caissons are sunk through clay or sand it is customary to leave the concrete cutting edge unprotected; where gravel, rip rap or other hard materials are encountered the cutting edge is protected by steel angles or hardwood timbers, depending on the material through which the caisson is to be sunk. Steel-protected cutting edges are not used except where the material penetrated is very hard and offers a great resistance. The hardwood cutting edge is found to give better protection to the concrete and on account of its greater width gives a much stronger caisson wall near the bottom.

Openings are left in the interior walls of sufficient size to allow the free passage of men and tools from one chamber to another in caissons where the excavation is to be done by hand. The walls of the caissons are made of 1:2:4 concrete and the core of 1:3:6 concrete; the only reinforcing used in the core is the stub bars for tying on the neat work.

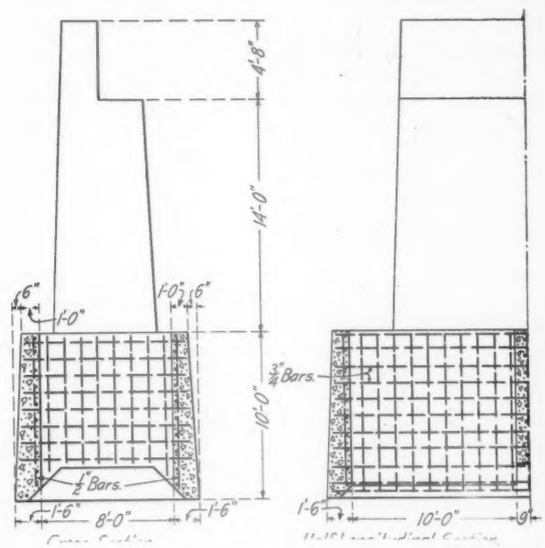


Fig. 2—A Later Type with Battered Walls

In cases where caissons are sunk to eliminate danger of scour, it may be found necessary to drive piling to carry the load. In this case the piles are driven in the usual way, after the excavation has been completed. Caissons sunk under these conditions are usually full of water and require sealing around the piles with a tremie. After the concrete has set sufficiently, the water is pumped out, the piles cut off, and the balance of the caisson filled with concrete.

When it is desirable not to have the caisson project above

the ground line a triple-lap wooden cofferdam is built on top of the concrete caisson, the lower wale being bolted to the concrete. When the pier has been constructed it is an easy matter for a diver to remove this wooden crib by unscrewing the nuts on the bolts holding down the cofferdam.

Fig. 1 shows one of the first concrete caissons built by the Burlington. Steel angles and plates were used to protect the concrete cutting edge, which is made very narrow to insure sinking of the caisson by its own weight. It has, however, been found by experience that it is not necessary to employ as narrow a cutting edge as the one used for this case. On this job a concrete cap covering was cast on top of the caisson, for the purpose of making a more nearly watertight joint between the caisson and the core. Subsequent experience has shown that this is not necessary.

Fig. 2 shows a caisson built one year later than the one shown in Fig. 1. It will be noted that the design of cutting edge has been changed, and that no protection is used for the concrete. The cross struts or walls have been raised two feet above the cutting edge, which allows a passage for the water from one compartment to the next and in that way simplifies the pumping problem. The outside of the walls has also been tapered off toward the top, the idea being to reduce skin friction. It has been found, however, that the difference in friction for the straight wall and the battered wall is very small and the battered wall design has been discarded on account of the greater cost of forming. This caisson was hand excavated, the material being removed by shoveling in stages. As the caisson was sunk for the purpose of getting below the scour line, and as there was no hard ground here near the surface, softwood piles were driven to carry the load. This caisson was sunk through clay, and only a small amount of water was encountered.

One caisson built in 1912 was sunk through stiff clay,

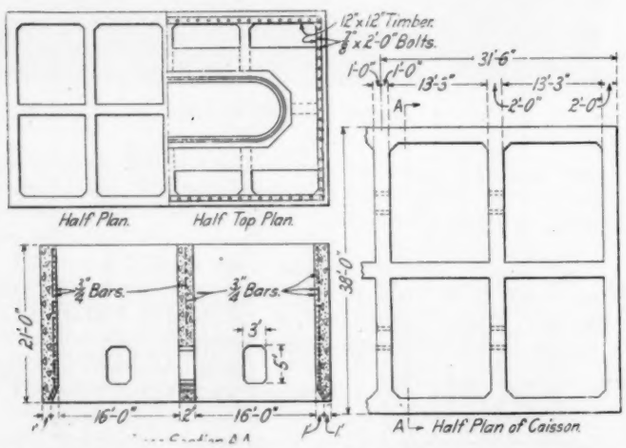


Fig. 3—Large Caisson Used for Pier 8 of the Metropolis Bridge

and for a while considerable trouble was experienced in making it settle. Even after the excavation had been removed below the cutting the box would remain suspended. It so happened that the old bridge at this point was a pile trestle, the new caissons being built between the old pile bents. The foreman one day conceived the idea that it would be possible to put up struts resting on the top of the caisson and long enough to reach the bottom of the stringers of the trestle bridge which would deflect under load, and then let a train across the bridge and in this way give the box an initial start. This scheme was tried and worked very well. After the caisson was once started, the skin friction was reduced enough to allow it to sink down as far as the excavation had been made.

A caisson sunk in the Missouri river at Kansas City, was built on made ground, retained by a dyke of cement sacks filled with sand. The sinking conditions here were very unusual, as the land side of the caisson had to penetrate a rock ledge while the river side was resting in sand and an old garbage dump.

The rock was blasted and removed by loading on skips and raising with a derrick. Considerable trouble was encountered from the water breaking in on the river side and several logs were encountered which had to be removed from under the cutting edge by pulling them into the caisson; one large log encountered about 10 ft. below the ground had to be cut off outside of the chamber before it could be pulled

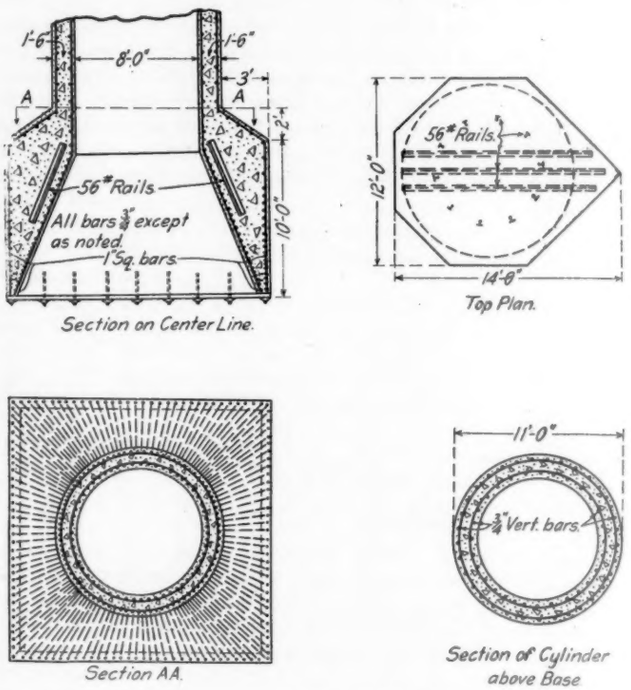


Fig. 4—Type of Caisson Used in the Ashland Bridge

in. The water trouble was finally overcome by the liberal use of cinders placed along the river side and the caisson landed on a rock bottom.

Fig. 3 shows the caisson used for pier No. 8 of the Metropolis Bridge over the Ohio river, and is the largest concrete caisson ever built by the Burlington. It was sunk through a sandy clay to a depth of 50 ft. below the ground line where a sand foundation was obtained. Originally it was planned to sink this caisson about 35 ft., but when this depth was reached the soil was still unsatisfactory to carry imposed loads, so it was decided to continue sinking. A timber cofferdam built on top of the caisson was wrecked by the high water and was replaced by building an additional 16 ft. of concrete caisson on top of the original one.

The excavation was removed by two clamshells operated from stiff leg derricks resting on pile supports driven at opposite corners of the caisson. Upon the completion of the excavation 129 soft wood piles were driven with long leads extending down into the caisson. The driver rested on top and was easily moved from pile to pile. After all the piles had been driven the caisson was sealed through 40 ft. of water with a tremie. After the concrete had sufficiently set the caisson was pumped out and the remainder of the concrete poured in the dry. The caisson was not completely filled with concrete, but open pockets were left along the two sides of the pier to save material. Upon the completion of

the pier to the top of the concrete caisson the timber crib was removed, letting the dirt fall into the open side pockets.

Where it is necessary to sink to a great depth a considerably larger caisson is required if it is constructed of wood, thus adding a large amount of additional excavation, as well as area subject to skin friction and at the same time reducing the average weight per cubic foot of volume to a large extent. This will be more clearly seen when we remember that as timber weighs only about two-thirds as much as water, it will require a considerable amount of concrete or other ballast to be placed in a timber caisson before any weight is available for the overcoming of skin friction. The overcoming of the skin friction of rest usually requires ballast of some kind even with concrete caissons when sunk to a considerable depth.

Fig. 4 shows a design of caisson especially adapted for deep foundation work. The pressures used in designing this kind of a caisson are the same as previously mentioned, and for great depths attain a considerable magnitude. It may seem at the first glance that it would not be necessary to design for hydrostatic pressure in addition to the usual earth pressure, but the caisson is sealed with only a few feet of concrete, and it is pumped dry before the core is filled with concrete. With this in mind, it will readily be seen that it is the proper thing to do; furthermore, the fill against the walls is a loose one, giving a maximum chance for large pressures being developed. The circumferential steel in the circular shaft, would not be required if we were sure of equal distribution of pressure along the entire circumference of the shaft; this, however, is a little too much to expect, there being a good many ways in which the equilibrium may be disturbed, such as cave-ins in the loose ground, boulders, scour on the up-stream half, or floating bodies striking the shaft. Caissons of this type, like the ones already discussed, can be built on artificial islands or on falsework, and lowered in place by the use of lowering screws. In some cases it may be economical to build a cofferdam, pump the water out and start the caisson on the inside.

The reason for the enlarged rectangular-shaped bottom section is to give larger bearing area and to reduce skin friction. Experience shows that this is a very effective way of doing both. Some fear was felt, when the first caisson of this design was being built, that the steering would be difficult; however, this proved to be erroneous. Rather the opposite is true. The railroad rails shown embedded near the top of what may be called the working chamber, are placed there to protect the concrete from excessive abrasion, due to the bucket rubbing against the sides of the working chamber. The shaft is built up in successive sections poured in place. In this case the sections were 13 ft., but this can be varied to any length desired. The caisson just described was one of several sunk in the Platte river,* near Ashland, Neb.; several circular steel caissons were also sunk for this bridge.

RAILWAYMEN'S WAR BONUS IN ENGLAND INCREASED.—The war wage of 21s. ($5.04 a week now granted to certain classes of railwaymen engaged in the manipulation of traffic has been advanced to 25s. ($6.00) a week. Boys and women will also receive certain advances in the war wage now granted to them.

A VAST LIGHT RAILWAY SYSTEM has been created in France, according to the British War Cabinet report for 1917, involving the supply during last year of approximately 1,700 miles of track and the whole of the equipment. Exclusive of these light railway systems the total amount of permanent railway track supplied complete to all theatres of war was about 3,600 miles.

*The construction of the bridge at Ashland was described in an article in the *Railway Age Gazette* of August 27, page 383.

Orders Governing Western Regions

THE RAILROADS included in the newly-created Northwestern, central Western and Southwest region, will be governed by the following orders recently issued by R. H. Aishton:

A communication dated June 12, asks that railroad managers be just as careful during the period of federal control to prevent damage to National forests from fires started by locomotives, as they were under private control when the possibility of heavy claims by the government made careful railroad operation good business practice.

A circular, dated June 13, states that the United States Fuel Administration will encourage the opening of new coal mines whenever it appears that this can be done without taking labor from mines already producing. New mines, however, should not be opened if it appears to the Railroad Administration impossible or inexpedient to furnish the necessary railroad facilities. The supplement sets forth in detail the procedure to be followed in filing applications for the opening of new mining properties.

Supplement No. 1 to Circular R. P. C. No. 2, dated June 12, contains a letter sent by the War Industries Board to the Central Advisory Purchasing Committee at Washington outlining a tentative method of procedure in securing cement supplies for the railroads. Railroads are urged to endeavor to get the benefit of the prices fixed by the government in placing orders for cement where such prices are lower than those which they are now paying. The supplement also contains a list of prices of cement at various points throughout the country fixed by the War Industries Board for the four-month period ending August 31.

Supplement No. 1 to Circular R. P. C. No. 13, issued June 14, clears up certain misunderstandings in connection with the disposal of scrap rail. The present maximum price for scrap steel rail, sold for rerolling purposes, is $34 per gross ton delivered at the consumer's works. This classification includes scrap steel rail five feet and over, standard sections, 50 lb. and heavier, free from frog, switch and guard rails. This may include pieces of switch points five feet and over, 50 lb. and heavier, which may be cut off so that no part of the taper is included, or other similar pieces, five feet and over in length. Because of the difference in price of $5 between other scrap rail and rail for rerolling, it may pay roads to sort scrap rail more carefully and cut off the tapering portions of switch points. Other scrap rail should not be sold at above $29 per gross ton delivered at the consumer's works, except when sheared to short lengths for use in cupolas or hand charging furnaces, when it may be sold at not above $34. Crop ends from resawed rail come under the short length class at $34 a gross ton.

Supplement No. 1 to Circular R. P. C. No. 3, issued June 15, contains additional instructions concerning the purchase of locomotive fuel. While railroads and coal operators are free to make contracts for railroad fuel at any prices agreed upon, that price shall not be in excess of the government price. Railroads are not permitted to furnish a preferential car supply in consideration of a reduced price. Carriers may contract for as large an amount of fuel for delivery each month from any operator as the necessity may require. Contracts, however, should not cover a period exceeding 12 months. If, for any reason, it is advisable to make a contract for a longer period, such a transaction must be previously approved by the regional purchasing committee. Railroads are requested to obtain bids on fuel requirements at the earliest possible moment and submit contracts for approval to the regional purchasing committee.

In making contracts the question of haul should be carefully considered. On account of the scarcity of coal roads

will undoubtedly be compelled to use grades which heretofore have not been desirable.

Supplement No. 1 to Circular No. 121, issued on June 14, asks railroads to report the number of contracts with outside companies for repairing cars and the number of cars by classes undergoing such repairs. Copies of the contracts are also asked for together with a statement of the average cost per car for repairs on each contract, apportioned according to the cost of the labor, the material furnished by the contractor and the material furnished by the railroad to the contractor.

In a communication to western roads, dated June 12, the announcement is made that the director-general authorizes each of the railroads under federal control to purchase one membership in the American Society for Testing Material. Railroads are asked to designate representatives for this society who can give the matter adequate attention.

Circulars on Track Labor

Supplement No. 4 to Circular No. 63, dated June 11, states that in order to co-ordinate the work of the government and private labor agencies in obtaining track labor, the various private employment bureaus at Chicago, Kansas City, Mo., St. Louis, Minneapolis, Minn., Duluth, Kansas City, Kan., Superior, Wis., St. Paul, Minn., Omaha, Neb., and Sioux City, Ia., were taken over by the United States Employment Service. Under the present scheme of organization any railroad desiring track labor will file its order directly with the government agency or with its branches, the former private agencies. Railroads are authorized to continue their present organizations for securing track labor but these will be under the general direction of the government employment service. The railroad agencies will offer no rates of pay, working conditions or boarding conditions different from those offered through the government agencies. When a railroad has its own labor agencies it will place its orders with the United States Employment Service at the same time that it places them with its own agencies, so that the federal organization may have equal opportunity to secure the required men.

Supplement No. 5 to Circular No. 63, dated June 13, provides that the standard day for all track laborers shall be 10 hours and that the maximum rate of pay for a track laborer outside of the large terminals, important industrial centers and metal mining regions shall be 27½ cents per hour. Within the large terminals and in important industrial centers the maximum rate shall be 30 cents an hour. The minimum rate shall be that fixed by the director general's order No. 27 and where minimum rates are higher than the maximum rates above specified, they shall apply. No allowances of any kind shall be made for board, or for any other reason, that have the effect of increasing compensation. Railroads may continue the practice of paying the fare for laborers from labor markets to the point needed and their return fare to the point where employed. Labor agents are not permitted to recruit laborers or forces for one company from another road.

A telegram sent to western lines on June 15, asks for information on the behalf of the Board of Railroad Wages and Working Conditions concerning the normal summer force of the various kinds of common labor and the classes of common labor which are needed quickly to put the property in normal shape for winter service; the rates of pay recommended as necessary to obtain an adequate supply of common labor; and the minimum differential expressed in per cent over the usual monthly earnings of common labor which should be paid a foreman.

Advertising Regulations

Circular No. 126 issued by the regional director of western railroads on June 11, directs that lines be governed by regulations relative to advertising prepared by the inter-regional advertising committee, A. L. Craig, chairman. These regulations provide that time-table folders will be informative only. All advertising of luxurious trains, claims of superior service, slogans, illustrations, and extraneous matter of every description, including paid and complimentary advertising, is to be eliminated. Trade marks, however, which serve to distinguish the folders of various lines and systems may be used.

A limited free distribution of local folders is authorized in foreign territory to meet the needs of the public and of ticket agents. The distribution of local folders in foreign territory may be covered either in whole or in part by the use of gateway folders to be prepared jointly by lines in the territory leading up to a gateway. In order to test the practicability of gateway folders the lines in the eastern region will issue a folder showing condensed service of all lines westward from Chicago, while lines in the western regions will issue a folder covering service on all lines from Chicago eastward. Joint folders between commercial centers will follow the standard for general local folders but may vary to such an extent in form and arrangement as will best show the service via all lines. Folders are to be distributed through the ticket offices and railroad information bureaus. No distribution is to be made on trains.

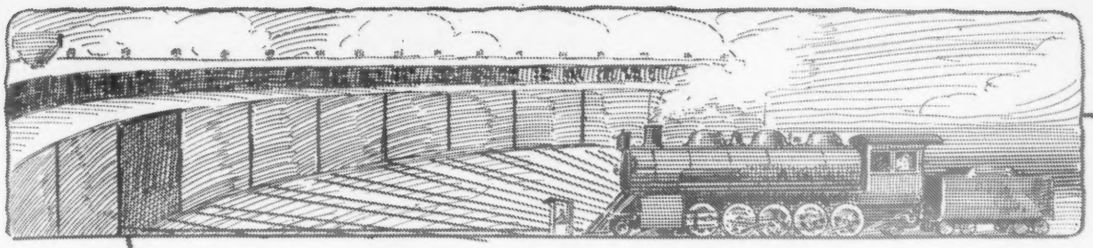
For the information of the public and ticket agents lines may at once issue resort, hotel and boarding house lists, but they should contain no maps or illustrations and where practicable will be jointly issued by lines interested. Descriptive resort publications are to be discontinued until further notice. Publications setting forth agricultural possibilities of sections of the country not now fully settled, may be continued, but where practicable should be joint. When reduced fares are made for special trains operated on account of state, county or industrial fairs, local excursions, etc., a limited amount of advertising is permissible.

The regulations also specify the manner in which schedules of individual roads shall appear in the Official Guide. No expense is authorized for representation in any other railway guide.

A letter sent to northwestern and central western railroads on June 17 contains a report from one of the largest western flour mills which indicates what can be done in connection with the intensive loading of flour. During the month of May this mill loaded 38 cars, with total marked capacities of 2,910,000 lb., with 3,228,986 lb. of flour, or 10.96 per cent overload.

International Film Service

Anti-Aircraft Guns Mounted on Railway Trucks



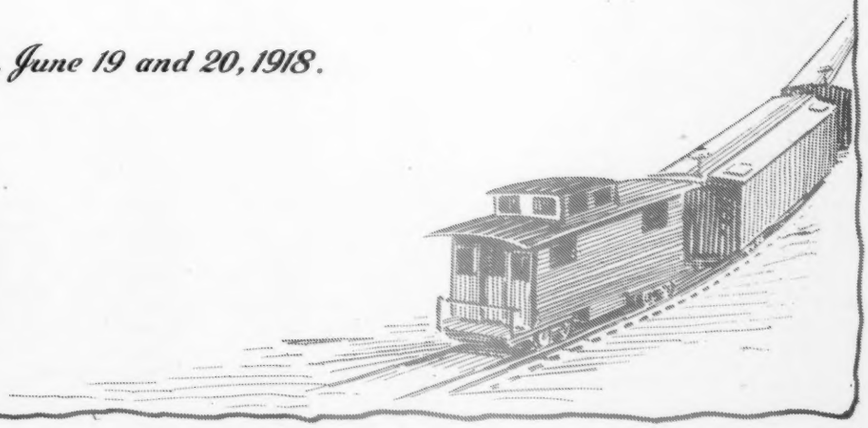
Report of the

Fifty-first Annual Meeting
of the
Master Car Builders' Association,

and of the

Fiftieth Annual Meeting
of the
American Railway Master Mechanics' Association

Chicago, June 19 and 20, 1918.



Comment on the Meetings

Grain Cars for Western Roads

THE MOST IMPORTANT matter brought before the attention of the joint meeting of the Master Car Builders' and Master Mechanics' Association was that of the car situation for grain loading in the West. Orders have been issued to send box cars to western roads to handle what will be a bumper crop. Cars have been sent indiscriminately to the western lines with the result that most of the roads are overwhelmed with box cars unsuitable for grain loading. One road received 4,000 cars which will have to be repaired before they are suitable for handling grain. Of about 2,000 on one road specified for grain shipment only 15 per cent were fit for that service. Another road reports only about 20 to 25 per cent of the cars received were suitable for this purpose. Something must be done to relieve the situation. It has been suggested that in ordering cars west the orders should state that the cars sent must be suitable for handling grain, and that the western roads be permitted to refuse cars not fitted for this commodity. The car repair situation the country over is serious. The shops both in the East and West are congested. The output is limited on account of lack of labor and material. In order adequately to meet the situation it will be far more practical to pick out the cars suitable for grain and send them West than to send unsuitable cars West and have them repaired there. Unless relief is given the western lines at once it will be impossible to handle the vast grain business this year.

Welding Truck Side Frames

THE PRACTICALLY unqualified endorsement of welding truck side frames and bolsters by the association seems surprising in view of the data presented in the exhibits accompanying the report. Of the two sets of tests the greater weight has apparently been given to those shown in book *B*. There were 23 castings tested in this series, of which only three broke in the weld. However, some of the tests give no indication of the strength of the welded members in tension. Six of the castings included in the tests reported in book *B* were welded in the compression member and one was tested transversely. Eliminating these we find that 13 of the test castings welded in the tension member failed outside the weld, while three failed in the weld. The data in book *A* were not summarized by the committee. Of the 21 side frames and bolsters, the test results of which are published in this exhibit, three castings had no defects, two had defects but were tested without being welded, and two were welded in the compression member. Of the remainder 11 broke in the weld and three outside the weld. Thus of all the parts welded in the tension member that were tested in both series 14 failed in the weld while 16 failed at other points.

It is reasonable to assume that the welding of these castings was done with fully as much if not more care than would be given to similar work under actual repair conditions. The committee in its report emphasizes the fact that the skill of the operator is the most important factor influencing the strength of the weld. Unfortunately this cannot be controlled by any rules adopted by the association to govern welding practice. Unquestionably the application of autogenous welding to the reclamation of side frames and bolsters will effect great economies and will help to keep equipment in service particularly under the present conditions of the material market. Careful supervision of the work will be necessary however to prevent failures from occurring. Care must be taken until the best method is finally determined. If wrecks should occur due to improper workmanship on welded parts the result might be the prohibition of this practice, desirable as its adoption may seem in the present circumstances.

M. C. B. Association and Federal Control

THE MASTER CAR BUILDERS' ASSOCIATION has in the past performed an exceedingly important function in the handling of inspection, repair and interchange problems of freight cars. Its field of usefulness is by no means reduced under government control. This association through its Arbitration committee has studied these problems for years and experience gained in this work makes it well qualified to continue it. Since the railroads have been under the control of the government the standard M.C.B. rules have been revised in different parts of the country to an extent which under the conditions of private ownership would not be tolerated. The Division of Transportation in issuing Circular No. 7 has made a radical modification of the rules. The order was put into effect without giving the M. C. B. Association an opportunity to modify its rules to agree with the circular. This naturally creates confusion among the inspectors and repair men who at best find it difficult to interpret the present rules. For the sake of uniformity and in order that the existing rules may be kept up-to-date and in accordance with the latest developments of the Railroad Administration all such matters should either be sent out through the M. C. B. Association as a government order or the association should be permitted to issue changes to the rules simultaneously in order that any conflicting rules may be revised. In view of its past experience this association can be made a valuable adjunct to the Railroad Administration.

Revision of Loading Rules

THE MASTER CAR BUILDERS' loading rules are an important factor in securing the maximum utilization of cars. If cars are not properly loaded the full capacity cannot be utilized, and the car is apt to be delayed in transit owing to the necessity of transferring or readjusting the lading. Evidently it was a realization of this fact that led to the complete endorsement of the loading rules by the Railroad Administration. While the intent of the clause in Circular No. 7 issued by Mr. Gray in which he states that discipline will be imposed for violation of the Master Car Builders' rules is not clear, it is safe to say that the intention is to compel shippers to load cars in accordance with these rules. With the authority of the Railroad Administration added to the weight which the Master Car Builders' rules carry, the committee should be able to get splendid results.

The present conditions require that cars be loaded, not

necessarily in the manner that is cheapest for the shipper, but in a way that will utilize the maximum capacity of the car and enable it to be sent to its destination without delay. The loading rules should be revised at once to secure this result. The committee has met the situation in a manner that leaves little to be desired. The adoption of the changes in the rules for loading lumber now under consideration should eliminate one of the major causes for transferring loads. Some other changes in the present rules with the same end in view should bring good results by insuring better utilization of cars and a reduction of the expense of transfer and loss and damage to lading.

Displaying Foresight After the Fact

WILLIAM SCHLAFGE, of the Erie, president of the Railway Master Mechanics' Association, ranks high among the mechanical officers of the railways of the country. His address at the meeting in Chicago was in part an inspiring appeal to the association's members to accept loyally and in good faith the new regime in railway affairs, and to do all they can to make government operation of railways a success.

There are features of Mr. Schlafge's address, however, which seem eloquently to manifest the common faculty of hindsight, rather than that very unusual faculty, foresight. By implication he criticises the Master Mechanics' Association because it had not during its 50 years of existence in time of peace "made constructive efforts to assist the nation to react reasonably to the conditions of war with its tremendous added burden upon the transportation facilities," or "so shape its course even to render assistance to the end, palpably in sight for many years, of a thorough co-ordination of the transportation business of the country in the interests of its people."

We submit that this is all very far fetched. If any member of the Master Mechanics' Association had suggested in one of its conventions prior to three or four years ago that this organization should take steps to assist the nation "to react reasonably to the conditions of war" he would have been laughed out of the meeting hall. Perhaps that is the reason why Mr. Schlafge never made the suggestion; for we are quite sure that he never did make it.

To criticise a civilian technical organization on the ground that it did not take steps to assist the nation to "react reasonably to the conditions of war," when it is notorious that the government of the nation itself did nothing of the kind until we were almost at war, borders on the absurd. Similar comment may be made on the reference to "the end, palpably in sight for many years, of the thorough co-ordination of the transportation business of the country." To whom was this end so "palpably in sight?" Mr. Schlafge conceded that the end was not palpable to "railroad interests," for he added: "It is only fair to say, however, that the limitations upon its (the Master Mechanics' Association's) proper expansion and development were largely beyond its control because of the general failure of railroad interests to recognize the fundamental principle that the transportation business of a nation is a natural state monopoly, and that, sooner or later, a progressive state will either dominate the control of its transportation lines or own them." The end in question certainly was not "palpably in sight" to government officials, for they were engaged in defeating by proceedings under the anti-trust law, every effort the now despised "railroad interests" themselves made to bring about co-ordination. It must be, then, that it was merely to Mr. Schlafge that this end was "palpably in sight." It is a great pity that there are so many people in the world who do not reveal what they have foreseen until after it is an accomplished fact.

Having disclosed that "to foreseeing men it has been clear for many years that even peace conditions demanded the nationalization, either under private control or public ownership, of all the transportation agencies of the country," Mr. Schlafge proceeds to show that, "therefore, standardization of the instrumentalties of commerce was inevitable if the highest efficiency was to be attained." He goes on not merely to defend standardization of locomotives, but to condemn the Master Mechanics' Association because "this association practically failed to recognize the ineluctable trend of events, so that when, as a necessary war measure, the national railway administration demanded a standard locomotive, the association had no standard to offer." The American Railway Association did have a standard freight car to offer, and it was not adopted. Why was there no standard locomotive available? Simply because nobody in the railway business—except, possibly, Mr. Schlafge, who kept very quiet about it—considered that, in the diverse circumstances in which locomotives must be operated, standardization of locomotives was either feasible or expedient.

It is extremely desirable that railway officers of all ranks and in all branches of the service should accept the new regime of government operation of railways gracefully, and put forth all of their ability and their energy to make it a success. Their self-respect and their patriotism will impel them to do so. But loyalty and patriotism do not demand, and their self respect should forbid, that they shall stultify themselves, and cast discredit upon their former superior officers and the associations to which they have belonged by criticising failure to do things which those making the criticisms never suggested ought to be done, and which the government and the public opinion of the United States prevented from being done. The course of the Railway Master Mechanics' Association, and the management of the railways of the United States, were not nearly so benighted before the adoption of government control as Mr. Schlafge would now have us believe; and even if they were this would be a late day for him and other railway officers to break their silence on the subject.

Saving Fuel in Power Plants

THE DISCUSSION of the report on Fuel Economy and Smoke Prevention at the Master Mechanics' Association meeting drew attention to one source of fuel economy which has generally been neglected. This is the railroad power plant. It is true that the aggregate saving which may be made in railroad power plants is small when considered in relation to the possibilities in locomotive service, inasmuch as probably not more than eight per cent of the total amount of fuel used by the railroads is consumed in power plants. At present, however, no possible saving should be overlooked, and while the supervision of fuel consumption on locomotives is very generally well organized and working according to highly developed plans, practically no organized effort has ever been made toward economy in the power plant. It has lately been repeated several times that with the careful application of the information on fuel economy which is already generally known, there would be an ample supply of coal to meet all requirements. To attain this end, however, organized effort is necessary. A study of railroad power plant conditions should generally be made with a view to developing effective methods of applying this knowledge and checking the performance of power plants. The plan of power plant supervision referred to by W. J. Tollerton in his discussion of the report, has resulted in a material improvement of conditions relative to fuel economy on the Rock Island. An aggregate saving of fuel too large to be neglected will result from a general development of some such plan of supervising the power plants of all the railroads of the country.

Master Mechanics' and Master Car Builders' Convention in Session at Chicago on Wednesday Morning, June 19

T. W. Demarest
Vice-President, M. C. B. Association

C. E. Chambers
President, M. C. B. Association

J. Coleman
Vice-President, M. C. B. Association

Master Car Builders' Association Proceedings

The Maintenance of Freight Cars and the Rules of Interchange Receive Special Attention

THE FIRST SESSION of the joint meeting of the Master Car Builders' Association and the American Railway Master Mechanics' Association was held in the Florentine room of the Congress hotel, Chicago, June 19, 1918. C. E. Chambers, president of the Master Car Builders' Association, presided. The meeting was called to order at 10:20 a. m.

While the papers of the two associations were presented without any attempt at segregation—the meeting being in fact a joint session—the following report of the proceedings of this meeting will be classified for convenience under the two heads.

Remarks by President Chambers

Gentlemen: We welcome you this morning at another one of our annual meetings. It is not necessary to state that since a year ago we have been making history, and it is also unnecessary to state that each day we do not know what is

G. W. Wildin
Vice-President, M. C. B. Association

J. S. Lentz
Treasurer, M. C. B. Association

V. R. Hawthorne, Secretary,
M. C. B. and M. M. Associations

going to happen, and what will be the condition of affairs the next day. The uncertainty of the times has made it necessary to follow out the principle established one year ago in holding as brief a meeting as we could to take care of the necessary business. Perplexing problems are coming before us from time to time in the form of instructions or orders. As an executive committee we get requests from the United States government or the Railroad Administration to consider certain changes; at other times we get a notice that such and such things are ordered. In that case it is only necessary to notify you that these orders have been put into effect, and this is going to continue. Many times orders will be sent out that individually we may not concur in, but we are all working for the one great cause—to win the war.

What we have gained in the way of progress in 50 years or more that these conventions have been held is by reason of the general getting together of a number of opinions, and boiling them down to find out which seems to be the best. That, I think, in all cases is the wise plan. However, regardless of what order may come, it is up to each of us individually or collectively to put into effect to the best of our ability anything that our government may want.

Letter from J. J. Tatum

The secretary read the following letter from J. J. Tatum, manager of the car repair section, U. S. Railroad Administration:

"It would have given me a great deal of pleasure to have been able to meet all at the annual meeting this year, but I feel at this writing it will be almost impossible. There are pressing matters here at Washington that require my attention, and I feel I will be compelled to sacrifice the pleasure it would afford me to attend this meeting.

"There is a stupendous task before all of us: our obligations to the nation at this time are greater than ever before in our history. For this reason I feel I should remain at Washington as close to the 'firing line' as possible, to give all possible support to the Railroad Administration that is within my power. Today you and I are helping by our efforts in keeping up the railroads of the United States to fight the greatest of all wars for Democracy. You and I have the task to see that every possible piece of rolling stock is made available to carry foodstuffs and munitions to our soldiers 'over there.' Not only for those noble men who have left our country, but for our allies, and the noble women of this and our allied countries who are doing Red Cross duties for our soldiers. There is nothing we can do for them that will equal what they are doing for us; they are giving their all, the best they have, their life. We should be equally willing to do as much for them over here.

"In closing I would ask that we all pledge ourselves to our President of the United States, his director general of railroads and assistants, to give all we have in ability and force at our command, in order that they may be able, through the railroads, with our energy and effort to meet every requirement of their responsibility and by the united efforts of our men we will have placed our flag in the foremost ranks for democracy and liberty of the whole world."

I. S. Downing (C. C. C. & St. L.): I move that this association pledge itself to the assistance of Mr. Tatum's entire section of the government's work. The motion was carried.

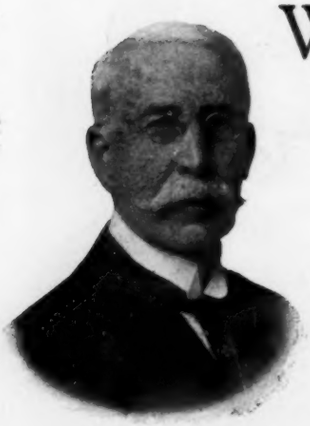
Report of the Secretary

The report of the secretary, V. R. Hawthorne, showed the membership in the Master Car Builders' Association on June 8, 1918, to consist of 446 active members, 593 representative members, 14 associate members and 19 life members; a total membership of 1,072. The receipts during the two years were $67,470.37 and the disbursements $65,300.50, leaving a balance for the period of $2,169.87.

(The report was received and a committee consisting of W. R. McMunn (N. Y. C.), J. H. Milton (C., R. I. & P.) and J. A. Carney (C., B. & Q.) was elected to audit the records.)

The President: Among the members that have died during the past year none is more noticeable than that of Joseph W. Taylor. He had been with the association so long that it seemed that he would always be there. I know that all the members miss him. We were very fortunate, however, in being able to secure, at least temporarily, Mr. Hawthorne, who from his number of years of railroad life not only was fitted for the office, but, having served practically one year as a member of the special committee inspecting the railroads, was exceptionally well fitted for this task, and it seemed to be most opportune that he should be at our disposal just at this particular time.

Revision of the Rules of Interchange



J. J. Hennessey
Chairman

WITH THE APPROVAL of the Executive Committee, this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules. The committee has decided that until the status of the Master Car Builders' Association in relation to the Master Car Builders' Rules of Interchange shall be established no change in these rules will be recommended except in the rules governing prices of material. During the year, arbitration cases No. 1061 to 1147 have been decided and copies have been sent to the members in accordance with our usual practice.

Changes in Rules Governing Prices of Material

RULE 98.

The committee recommended that the table of prices for wheels and axles shown on page 128 be revised as follows:

		New	Second-hand	Average credit price
One 36-in. cast iron wheel		Eliminate	this	item.
One 33-in. cast iron wheel	From..	$9.00	.....	$4.75
	To ...	15.00	.....	7.75
One 33-in. cast steel wheel	From..	19.50	.....	9.75
	To ...	37.00	.....	16.00
				Scrap
One 33-in. wrought or rolled steel wheel..	From..	19.50	.....	$4.50
	To ...	50.00	.....	8.00
One M. C. B. Standard axle, 140,000 lb..	From..	25.50	$15.25	4.50
	To ...	46.50	27.90	9.30
One M. C. B. Standard axle, 100,000 lb..	From..	19.50	11.75	3.70
	To ...	40.00	24.00	8.00
One M. C. B. Standard axle, 80,000 lb...	From..	16.50	10.00	3.00
	To ...	33.00	19.80	6.70
One M. C. B. Standard axle, 60,000 lb...	From..	13.00	7.75	2.00
	To ...	26.00	15.60	5.30
One M. C. B. Standard axle, 40,000 lb.....	Price to remain as at present			

RULE 120.

The committee recommended that the average scrap credit

prices allowed for wheels removed from dismantled cars, under the provisions of Rule 120, and shown near the bottom of page 130, be revised as follows:

	From	To
One cast iron wheel, 50,000 lb. capacity or under	$2.75	$3.40
One cast iron wheel, 60,000 lb. capacity	2.90	3.70
One cast iron wheel, 80,000 lb. capacity	4.75	7.75
One cast iron wheel, 100,000 lb. capacity	4.75	7.75

The committee recommended that the table covering new and average credit prices for non-M. C. B. standard axles, shown at the top of page 130, be revised as follows:

		New	Average credit price
One non-M. C. B. axle, 70,000 lb.	From	$14.30	$2.40
	To	28.60	8.00
One non-M. C. B. axle, 60,000 lb.	From	13.00	2.00
	To	26.00	5.30
One non-M. C. B. axle, 50,000 lb. or under.	Prices to remain as at present.		

The committee recommended that the first paragraph on page 132 be revised to read as follows: "The price for new wrought steel wheels shall be based on the scrap value of $8.00 for metal inside the condemning limit (which is ¼ in. above the limit groove) plus $1.75 for each 1/16 in. of service metal (on radius of tread) in connection with standard full flange contour, also base of limit groove not less than 29½ in. in diameter. In no case shall a charge or credit for service metal be made in excess of 1½ in."

Rule 101.

The committee recommended that the following prices be revised:

	From	To
Item 106a and Item 106c to be consolidated in one item to be known as Item 106a.		
Item 106a. Coupler complete, new, M. C. B. "D" either 5 in. by 7 in. or 6 in. by 8 in. shank	$18.00 / 18.30	$26.00
Item 106b and 106d to be consolidated in one item to be known as Item 106b.		
Item 106b. Coupler body, new, M. C. B. "D" either 5 in. by 7 in. or 6 in. by 8 in. shank	10.85 / 11.15	15.75
Item 106e. Coupler knuckle, new, applied, M. C. B. "D"	4.55	6.55
Item 106f. Coupler knuckle lock, new, applied, M. C. B. "D"	1.35	1.95
Item 106g. Coupler lock lifter, new, applied, M. C. B. "D"	.25	.35
Item 106h. Coupler knuckle thrower, new, applied, M. C. B. "D"	.47	.65
Item 106i. Coupler knuckle pin, new, applied, M. C. B. "D"	.53	.75
Item 107. Coupler, M. C. B., complete, new, steel 5 in. by 5 in. shank	9.00	19.00
Item 108. Coupler, M. C. B., Temporary Standard, complete, new, steel 5 in. by 5 in. shank	10.50	21.50
Item 109. Coupler, M. C. B., complete, new, steel 5 in. by 7 in. shank	9.50	20.00
Item 110. Coupler, M. C. B., Temporary Standard, complete new, steel 5 in. by 7 in. shank	11.00	22.50
Item 111. Coupler body, M. C. B., one, new, steel 5 in by 5 in. shank	5.90	12.50
Item 112. Coupler body, M. C. B., Temporary Standard, one, new, steel 5 in. by 5 in. shank	7.40	15.00
Item 114. Coupler body, M. C. B., one, new, steel 5 in. by 7 in. shank	6.40	13.50
Item 115. Coupler body, M. C. B., Temporary Standard, one, new, steel 5 in. by 7 in. shank	7.90	16.00
Item 118. Coupler knuckle, one, new, solid, applied	2.25	4.75
Item 119. Coupler knuckle pin, one, new, applied	.25	.50
Item 120. Coupler lock, one, new, applied	.60	1.25
Item 105. Weighing over 100 lb. each, including bolsters, side frames, etc., per pound	.04	.08
Scrap credits for the above items to remain as at present.		

Rule 111.

The committee recommended the following changes in Rule 111.

Item 56. Triple valves removed, cleaned, oiled, tested and stenciled, including all necessary repairs (labor and material), exclusive of renewal of body or conversion of valve from one type to another.

Average charge $1.10

Details.	Cents
Train pipe union, disconnected	3
Retaining pipe union, disconnected	3
Removing triple (2 nuts, ⅝ in., 2 cents each)	4
Check valve case (2 cap screws)	2
Emergency valve seats	5
Cylinder cap (3 bolts)	3
Cleaning, testing, stenciling and repairing, including material	90
Total	$1.10

(Note.—This average charge also includes the 1 in. union gasket for branch pipe and the ¾ in. union gasket for retaining pipe, in connection with triple valve.)

Items 9, 30, 31, 48, 50, 52, 55 and 58 are to be omitted.

Reason: This average will obviate the necessity of following up each individual triple valve to ascertain just what repairs are made, including valves shipped to the manufacturers. At present there is no uniform practice of obtaining this information on the various roads and no doubt many of the detail changes are overlooked, while others are assumed. The proposed average charge will eliminate a lot of complicated records.

Passenger Car Rule 21.

The committee recommended that the following price be revised.

		From	To
Item 26.	Wheels, steel-tired, average value service metal per ⅛ in. (on radius of tread in connection with full flange contour), whether defects are owners' or delivering line	$1.00	$1.25

Passenger Car Rule 22.

The committee recommended that the following prices be revised:

			From	To
Item 46.	Wheels, wrought steel, loss of service metal, per ⅛ in., 33 in. wheel	Change charge / Change credit	$0.625 / .625	$1.75 / 1.75
Item 47.	Wheels, wrought steel, loss of service metal, per ⅛ in., 33 in. wheel	Change charge / Change credit	8.75 / 8.75	2.00 / 2.00
Item 48.	Wheels, wrought steel, loss of service metal, per ⅛ in., 38 in. wheel	Change charge / Change credit	1.00 / 1.00	2.25 / 2.25
Item 49.	One 36 in. cast iron wheel.	Change price, new... / Change average credit price	10.50 / 5.25	17.50 / 8.50
Item 50.	One 33 in. cast iron wheel.	Change price, new... / Change average credit price	9.00 / 4.75	15.00 / 7.75
Item 51.	One 36 in. wrought steel wheel	Change price, new... / Change price scrap..	26.00 / 5.00	59.00 / 11.00
Item 52.	One 33 in. wrought steel wheel	Change price, new... / Change scrap price..	19.50 / 4.50	50.00 / 8.00
Item 53.	One 33 in. cast steel wheel.	Change price, new... / Change average credit price	19.50 / 4.75	37.00 / 16.00

The committee further recommended that these changes in prices be made effective as soon as possible.

The report is signed by J. J. Hennessey, chairman, C., M. & St. P.; T. W. Demarest, Pennsylvania Lines; Jas. Coleman, Grand Trunk; F. W. Brazier, N. Y. C.; and T. H. Goodnow, C. & N. W.

Discussion

Geo. F. Laughlin (Armour Car Lines): I would ask, before the acceptance of the report, if this 35 per cent added to the bills will also be added to these prices?

T. H. Goodnow (C. & N. W.): That is the understanding.

I. S. Downing (C. C. C. & St. L.): Will Circular No. 7 issued by the Division of Transportation affect these rules? This says that the receiving roads shall transfer the load at their own expense, while Rule 2 refers to American Railway Association Rule No. 15, which says that the delivering road will pay the expense. I ask the committee whether or not it intends to take that into consideration.

Mr. Goodnow: The committee did not know of Circular No. 7 when the report was prepared. The rule will be changed either as a result of this circular or under special instructions from the American Railway Association.

H. L. Osman (Morris & Co.): I would like to call attention to the prices allowed for trucks of destroyed cars. The rules provide, Section 315, for a 60,000-lb. capacity car. I think you will all admit that the price is far below the present cost of manufacturing trucks of that capacity. I find that a 60,000-lb. capacity truck with steel truck sides and steel truck bolsters costs in the neighborhood of $650. Making the price $315 is not quite in line with the costs of construction. This is borne out by the fact that very few railroads are today returning the trucks of destroyed cars.

T. L. Burton (N. Y. C.): With regard to Item 56, which recommends the price of $1.10 for removing, cleaning, oiling, testing and making all necessary repairs to the triple valve, with the two exceptions which are mentioned. That subject was referred to the Train Brake and Signal Commit-

tee, of which I am chairman, and it is covered in a report we are making. We failed to concur in any suggestion of that kind, for reasons which are stated in the report. Briefly stated, the reasons are that $1.10 would not go anywhere near covering the expense of repairing a triple valve, and we feel that the price fixed should be an average price, for the repairs and cleaning, because the present scale of prices would result in neglecting the question of repairs and confining attention almost exclusively to the more profitable job of cleaning.

Mr. Goodnow: Answering Mr. Burton, the Arbitration Committee was not aware that this matter had been referred to his committee. The average price of $1.10 is obtained by the billing records of at least all of the roads represented on the Arbitration Committee, and I believe of one or two others. The expense of taking the triple off, taking it to the air brake room and giving it the necessary attention, including the testing, are included in this item. These records show that on several thousand cars on each road it runs from $.90 to $1.20. Therefore, the average of all was taken at $1.10, which would, of course, carry the 35 per cent with it. You understand that there are certain exceptions, such as converting an *H* triple to a *K* triple, and one other that is mentioned.

Mr. Burton: I do not know how the price could possibly cover anything except the minor repairs that ordinarily go with the valve in its cleaning and oiling, especially when it includes the material and substitution of worn sockets and worn packing rings, and things of that kind. Such a price as this leads to the practice of putting old material in the valves in making ordinary repairs.

Mr. Goodnow: It probably would not if you take the individual triple, but if you take the thousands that go to your triple valve room the general average will cover it.

Mr. Burton: The principal point is that the rule will result in neglecting the triple valve entirely.

Mr. Goodnow: If he wants to take that chance on his road, that is true. The association is trying to check that matter now by having a report filed by all roads as to the tests they make and the style of rack they use. It would seem to me that if the Air Brake Committee has a report to make, that this report must be held up until we have the benefit of their report. I move that that one matter be held in abeyance until Mr. Burton's committee makes its report.

Mr. Osman: May we not have an expression from the committee as to this truck question?

Mr. Goodnow: The committee by its last action on Rule 113 for the settlement of cars, attempted to reimburse the car owner for the car since the war prices went in in 1914, by departing from the old arbitrary rule of prices as established in the M. C. B. rules and accepting the book values of cars. I appreciate that is not going to take care of the point that Mr. Osman raised, because the old arbitrary value will stand on the trucks if they are held. I think at the present that this is one of the things to be given consideration before the rules are issued in October.

The arbitrary values do not represent the value of the truck, either as salvage or scrap at the present time. But that is tied up with the general value of the car. Prior to 1914 we settled on the arbitrary value, but the arbitrary value of cars prior to 1914 does not represent the reproducing cost of that car today by any means. It did fairly compensate the company at that time for what cars were costing then. Now, if you are going to pick out the item of trucks, I can't see how we will handle it. Two years ago we attempted to establish fair valuations of cars, but had to give it up. When it comes to the trucks on cars prior to 1914, I am not prepared to say this morning just how that could be handled.

The President: There is no report coming before us that will have any bearing on that.

Mr. Goodnow: The committee has practically no report at all. The prices that were changed were changed on account of being brought up by Mr. Tatum. On account of the suggestion coming from that source the Arbitration Committee recognized it and made those changes. Otherwise the committee has not taken any action, but did think that it could do so before the rules are issued in October.

J. J. Hennessey (C. M. & St. P.): There was a feeling a year ago that several questions would possibly come up before the rules would be changed. You remember the Arbitration Committee was authorized by the association to make such changes as they found absolutely necessary, and that was the feeling when the committee made this report.

A. E. Smith (Union Tank Line): I would like to ask what the association is going to do with the rule becoming effective on October 14 in regard to tank cars.

Mr. Goodnow: That is another rule that will simply have to be held in abeyance and action taken in the issuance of the rule, or in a circular prior to that time, taking care of that feature, if it is a necessity.

The President: I think now is the time for some action to be taken.

I. S. Downing (C. C. C. & St. L.): On the Big 4 at all inspection points we have put this Circular No. 7 in effect. If there are other rules that must be changed I think we should ask Mr. Gray if it would not be better to modify the rules through the Arbitration Committee. If we don't do it we are going to get badly mixed up.

F. C. Schultz (Chief Joint Inspector, Chicago): It occurs to me it will be necessary to take action on this now. Circular No. 7 will probably go into effect July 1. Mr. Goodnow is right; several changes are made. It occurs to me that within these two days we could work out something that would be in harmony with Circular No. 7 and adopt it as of July 1. Our rule provides that we can refuse cars under certain conditions. This rule compels the acceptance of all cars. That is one item alone that requires attention.

Mr. Goodnow: I don't believe that the Arbitration Committee would be able to act on the floor on embodying Circular No. 7 in the M. C. B. rules. That order is perfectly plain, and if it is to be put in, I believe that the Arbitration Committee can weave it into the rules, if the balance of the rules are to remain undisturbed and in line with authority. At the present time I don't feel that there is any action that can be taken until we have some expression of that kind. The interchange in the different terminals at the present time is being conducted on entirely different plans. Each big district or territory is independently putting in rules and systems carrying out its own ideas and governed by the local conditions.

The President: It goes without saying that Order No. 7 is effective. It doesn't say July 1 or December 1, but it says June 8, and so we have got to put that into effect. I think it would require some little thought as to just what M. C. B. rules might be affected by this order. I agree with Mr. Downing that a proper channel would seem to me to place these suggestions before the Arbitration or Executive committees for consideration.

Mr. Downing: I have maintained that there is no better way to interchange cars than under the M. C. B. rules. You might take the same position with regard to this general order that Mr. Goodnow does about the A. R. A. rules. It is not a physical operating rule. The repairing of cars at the nearest repair point is not a part of the M. C. B. rules. Determining the cost of the transfer as the transfer is made is not a part of the M. C. B. rules.

The President: We all may expect what we might consider a good many irregularities during transformation. All these things will be taken care of in a proper way when we have had time. As president of this association I naturally would raise the question as to just what Mr. McAdoo and Mr. Gray expect us to do or how they expect us to do it. I think we

should have suggestions for consideration, and I think this matter will shape itself in due time.

C. F. Giles (L. & N.): May I ask if there has been any response made to the communication in regard to the coordination of these associations with the American Railway Association, which was considered at our meeting in May.

The President: Mr. Schlafge's letter and my letter were presented to Mr. Thompson, and they were brought before the Executive Committee of the American Railway Association possibly two weeks ago. Mr. Thompson called a meeting in New York on June 28 to go over this matter further.

Mr. Goodnow: It occurred to me that the recommendations of the Master Car Builders' Association would take care of the situation as suggested by Mr. Downing; that is, this association be recognized as a section of any association that may be formed. It seems to me that this is not the proper time to undertake to embody Order No. 7 in the M. C. B. rules. That order has been issued over the signature of Mr. Gray, approved by Mr. McAdoo, and all we can do now is to put it into effect, trusting that later on the Master Car Builders' Association, as a section of the proposed organization will be given an opportunity to pass upon questions of that kind before the order is put into effect. I believe if that organization is effected that it will take care of this situation.

F. W. Brazier (N. Y. C.): That was just the point I was going to raise. I think the members of this association, of fifty years' standing, know better how this should be handled than people that have had no experience. I was in hopes that the resolution which the joint bodies made here to the American Railway Association would have gotten further along and would have gotten before such men as Mr. McAdoo, and that they could see that here is a body of men that really has made the railroads easy running by its rules of interchange.

There are very few officers who know the condition of the equipment that is running through the country today. We have over 2,000 box cars standing on our line, and if I were asked tomorrow to put them in the grain service only about 10 per cent of them would be fit. Everybody seems to think the equipment is all right, but there is going to be an awakening by and by.

I am willing to go on record, and practically every car man ought to be, about the condition of the equipment of the country today. The gondola cars, which come north loaded with lumber, are substituted for hauling coal and other commodities for which they are not suited.

Mr. Goodnow: It seems to me that the railroads have not yet fully understood that there is only one railroad in the United States. There are now no independent roads. I believe that Circular No. 7 is only the start of the changes which will have to be made under the new order of affairs. Doing what we have called interchange in the past, is eventually going to resolve itself into the same thing as handling cars over your own line from one division to another. Undoubtedly when that is brought about, the proper regulation of the repairs and maintenance of equipments will come along with it. I have in mind one large terminal at the present time that is departing entirely from the established practice in the past. The receiving line's inspection is being cut out and the delivering line is inspecting the cars for protection under the rules where defect cards are due. It handles it with one force of inspectors. It needs no joint force to handle it, and if it works out it will be the simplest plan for handling cars under the present demand.

The M. C. B. rules are going to be changed. It is not a question of inspecting for certain defects on the car, belonging to a private car line, or an individually owned car, but the prime essential in connection with railroad cars is the question of their maintenance, and that is the only thing vitally important at the present time. There is no interchange inspection now, and should not be; it is only a question of maintaining the cars, and it will resolve itself into a repair proposition.

Samuel Lynn (P. & L. E.): The fact that this order is issued shows that our superiors in Washington think this action is necessary. I do not think we should do anything today to criticise this action.

James Coleman (G. T.): I think the rules will be changed materially from time to time, and as orders are issued from Washington, the Arbitration Committee should apply them to the rules as they now stand. I understand that an order issued today abolishes the per diem. If that is true, all of the equipment in this country is practically pooled. The next question is in connection with maintenance of equipment. We should be prepared to consider certain recommendations to see how we shall maintain our equipment because it is all pooled.

The President: There is a question before us by Mr. Goodnow in connection with the report of the Arbitration Committee on withholding a portion of the report referring to the cleaning of triple valves.

Mr. Laughlin: There are certain changes in the way of making effective dates in the rules which will be necessary to facilitate the movement of equipment, and I understand from this discussion that these changes will be made by the Arbitration Committee before the rules are put into effect. I have in mind Paragraph F of Rule 3, which relates to the refusal of cars that have not been equipped with brine retaining devices. All the cars will not be equipped by the date when the rules are to be made effective, and we are asking for an extension of that time. I would like to know if that will be considered.

Mr. Goodnow: That naturally will be considered. As I have stated before, it was the intention to reissue the rules the same as usual, provided we got advice that that should be done. At the same time, as to such questions as Mr. Smith and Mr. Laughlin have brought up, such matters should be presented in writing, so that they will not be overlooked. I think these rules are all dated October 1, and none has to be acted on prior to that time.

(Mr. Goodnow's motion was carried.)

W. J. Tollerton (C. R. I. & P.) (reading a letter): It has occurred to me that, in view of the desirability of avoiding, in every possible way, delays to freight cars incident to the making of repairs when standard material is not available, that the M. C. B. Association should issue a circular authorizing the railroads to make wrong repairs, as they may see fit, to foreign cars in their possession whenever such wrong repairs can be made in a manner permitting the car to be retained satisfactorily and safely in the service for which it is intended.

At the present time there are undoubtedly a great many instances where cars are being held out of service a number of days awaiting the receipt of standard material ordered from the owner, when in reality wrong repairs could be made and the car released with but a trivial delay.

If the M. C. B. Association sees fit to issue instructions of this character, it is my further recommendation that during such period as the association may see fit to permit of such practices, the party making the wrong repairs should be absolved from any reclaim on the part of the car owner for the expense of standardizing repairs upon the arrival of the car on its home rails.

(Continuing, he said):

The western lines are all in the same position as regards foreign cars coming to their roads. As Mr. Goodnow has said, the receiving line has nothing to say as to what class of equipment shall be taken in interchange. In the past few months the foreign cars on our railroads have increased something over 200 per cent. Within the last two weeks we received an order from the car distributing section at Wash-

ington ordering 13,000 box cars to our lines for grain movement, and the prompt handling and loading of cars is important. It is a problem with us to handle that vast number of cars.

Take the case of a car coming from the New Haven and going to Herrington, Kan., for a load of grain. If we could put it in shape to load and send to the Atlantic seaboard, it would be folly for us to be held down by some restriction compelling us to go to the New Haven for certain repair parts, or be penalized for making wrong repairs. What has happened to us has happened to every railroad in the west. Therefore, I think it is very important that some modification be made of the wrong repair rule as it now exists.

Mr. Brazier: I wish to make a motion, that the Executive Committee send out a notice to the members to the following effect: Empty cars of 60,000-lb. capacity or over, when placed on shop or repair tracks for repairs must not be returned to commercial service until they have been placed in condition to meet full M. C. B. inspection without exceptions, including United States Safety appliances.

We are practically one railroad since the pooling question has been settled. If any car can be made fit for grain service, make it fit for grain service. If it is not fit for heavy freight, make such repairs to it as are necessary and use it for coarse freight.

There are many open top cars that are perfectly safe to carry lumber, but they cannot be used for ore and coal because the mechanism of the hopper doors and floor conditions are such they will not even carry coal, much less ore, and someone must repair these cars. For years we have done as little repairing as we could on foreign cars and keep them moving. We had about five per cent bad order cars ourselves and on looking over the foreign cars we had, we found a less percentage of bad order cars than with our own. We were not taking any more foreign cars for repair than we had to; we preferred to do the work on our own cars.

As far as the safety appliances are concerned, you can put on anything you like, and as long as they meet the requirement of the federal law, we will not say a word, as long as the repairs fill the bill. We lack 8,000 cars of having our gross number of cars completed, and we are going to treat your cars that way, gentlemen, whether you like it or not.

Mr. Coleman: I wish Mr. Brazier would embody in his recommendation that cars shall be inspected for certain classes of commodity or lading. In case there are 2,000 bad order cars on the New York Central they may go to the Rock Island, and that road will have 2,000 cars to repair before it can use them for loading grain. We have 75 per cent of our foreign cars, out of nine per cent held for repairs, in the shop today. These we got on our lines because our transportation department did not say what they wanted to load in the cars. You must get the co-operation of the transportation department and traffic department in order to make a proper inspection of these cars for loading, and each railway asking for cars should say what they want to load in them.

A distinction should be made in inspection, and that is why I suggest certain recommendations be made to Washington as to how we should keep the cars in repair and maintain them. The time is coming when there will be no billing for repairs to cars as there will be only one railway.

Mr. Goodnow: The remarks by Mr. Brazier and those by Mr. Coleman are foreign to what Mr. Tollerton started to bring before us. The M. C. B. rules at the present time, so far as wrong repairs are concerned, are very elastic and the change which was made some two or three months ago positively permitted repairs of any kind to foreign cars so long as they were owner's defects and the only redress the car owner had was to charge for the labor to correct them. That only excepts the wrecked cars—if you wreck a car the M. C. B. rules require that you rebuild it. I feel that the Arbitration Committee, if it is the expression of the meeting, would be willing to take under further consideration the portions of the report dealing with wrecked cars and the permitting of billing for labor only in correcting wrong repairs. I think it would be well to have Mr. Tollerton make that as a motion and then the Arbitration Committee will simply change its rules.

J. H. Milton (C. R. I. & P.): In our shops and on our railroad the work on the cars of other roads has increased about 75 per cent. We are making every effort possible, to turn out the foreign cars so that they will haul grain or any commodity you may wish to load in them. In unloading these cars on a railroad, if it has not the facilities for repairing the car at that point it will certainly have to provide them. In that case they have to undergo a back haul on it, and it will be very expensive to haul the car from one place to another. If you are not going to put all the repairing of the bad order car on to the other fellow we have got to get into the game somewhere and make facilities to take care of the cars.

As far as the repairs of their own cars is concerned I think the roads can take care of that, but we must understand that each road will have authority to make such repairs as it can with the best means at hand. We have been doing that on our railroad, and using such material as we can find, for such parts as grab irons, center posts, etc. It is much cheaper, even if we have to pay for it, to put these parts on with wrong material than to hold the cars for 60 days.

C. N. Swanson (A. T. & S. F.): We are facing one of the biggest grain crops which we have ever had and with scarcely a car with which to commence moving that crop. Orders have been issued that we are to receive about 15,000 box cars for grain loading. They have already begun to reach our lines and an inspection of 39 cars showed that only 9 of them were fit for grain loading. What will be the result? The side tracks of the western roads will be congested with bad order cars and no facilities for taking care of them, and no cars for loading, and we are faced with one of the most serious problems we ever had in the west.

W. J. Tollerton: I move that the Arbitration Committee be instructed to withdraw the rule permitting the billing for correction of improper repairs.

C. W. Van Buren (C. P.): In any changes you might make in the rules I would like to call your attention to the fact that there are Canadian railroads which are not under federal control, and I ask you when you are making changes in these rules, to insert a clause which will cover the situation of the Canadian railroads.

Mr. Coleman: The railways in Canada will no doubt consider changing their policy to meet the changed conditions over here. They will have to do that in order to interchange their cars going to and coming from the United States. What that change will be I do not know. We are ready to do that and we are considering it now.

The President: I do not believe the motion as put is going to hurt any individual railroad as much as they think it will. I think in the past many ill-advised things have been done to make things standard.

Mr. Laughlin: I understand that this is restricted to cars under federal control. I am saying this, because I think it should be said, and I am saying it in favor of refrigerator cars, because under certain circumstances if certain materials not having the same insulating value were used, it would affect the efficiency of the cars.

The President: The rule contemplates the safety of the car and the efficiency of the car, so I cannot see that it would damage your cars at all.

M. F. Covert (Swift & Company): In connection with Mr. Tollerton's motion I think some exception should be

made to the effect that roads not under government control be excepted, because there have been certain rulings by Mr. Prouty of the Division of Accounts in connection with a certain order that has been issued and that order has reference to returning bills for correction. Mr. Prouty has ruled in the case of private lines that that order only referred to roads under federal control, and therefore Mr. Tollerton's motion would conflict with private ownership.

Action Taken

The report of the committee was approved.

T. H. Goodnow (C. & N. W.): The Arbitration Committee, at a special meeting held since presenting its report, decided to ask the approval of the following so that it can be immediately issued as a circular.

"M. C. B. standard 60,000-lb. capacity axles with wheel-seat less than the condemning limit for such axle, but above the condemning limit for a non-M. C. B. standard axle may be used until October 1, 1920, to replace M. C. B. standard 60,000-lb. capacity axles with wheel-seats less than the condemning limit for such axles, but above the condemning limit for non-M. C. B. standard axles."

This is simply recognizing a practice already in effect, but it will make it plain to some who feel it is not as plain as it should be at the present time.

On motion the recommendation was adopted.

Discussion on Freight Car Maintenance

THE CHAIRMAN: It is of great importance that the Master Car builders' Association go on record as to the importance of the requirement that cars delivered for lading by other lines be in fit condition for the lading intended. Some of the western lines are going to be loaded up with cars sent to them for the loading of grain which they will not be able to use. The western lines are going to suffer unless they can get some relief from the lines sending the cars and the intervening lines before the cars get into the loading territory.

C. E. Fuller (U. P.): It ought to be the consensus of opinion of the association as well as the railroads in general that an order for cars should carry with it an understanding that the cars be a least in serviceable condition for the commodity which they are to haul. Cars have been sent to the western lines with bad order cards on them. The condition of the cars plainly indicate that they have been on the repair track for months.

The crop of wheat in Kansas and Colorado, if nothing interferes with it, is going to be the largest crop we have ever had, and it is going to take a large number of cars to handle that grain quickly. In general, repair points on western lines are far apart and if the eastern lines send bad order cars it is going to swamp all of us. The desire to move cars quickly is an incentive to the transportation departments to move them irrespective of their condition and have them repaired at the loading point. There is a limit to that, and if the mechanical departments do not make a strenuous effort to have the roads send only cars in suitable condition for loading we will not be able to handle the business.

No one knows more about what should be done to make cars acceptable than the members of this association, and we should not sit still and approve, or not disapprove, of a practice that is ultimately going to get us into trouble. We are going to be blamed for this condition and we had better make ourselves felt before we are in trouble, and not afterward.

Many cars are all right for rough loading, and unfortunately we in the west have a lot that are in that condition, and if we get still more there is a limit to our capacity to handle these cars.

F. C. Schultz (C. J. I., Chicago): What must be done is to control the situation in some manner in the way of repairs. The bad order situation today as far as this city is concerned is worse than it ever was since I can remember. It is going to get much worse on account of the pooling of equipment. We must get ourselves in a frame of mind by which we can't tell a Rock Island car from a Union Pacific car. If we were able absolutely to control the movement of bad order cars into a territory where they have the loading, we could repair them. In a city like this or others as large we should co-ordinate our facilities. There are occasions here where private car shops are out of work when our railroad shops are full of bad order cars and if some plan could be worked out by which we could put the cars where we could repair them and assemble the material we could do something.

T. H. Goodnow (C. & N. W.): The situation just referred to is the least of our troubles. Under the congested conditions of handling traffic we have got to repair the cars outside of the large cities, and that is particularly true of the lines in the west. The sixth clause of circular No. 7 of the Division of Transportation says, "empty cars offered in interchange, if in safe and serviceable condition, must be accepted." Under the Car Service Commission's rulings, M. C. B. rules so far as the acceptance of cars is concerned have practically been abrogated. Empty cars must be accepted regardless of their condition. They have said to you in effect if they were not fit for grain, use them for brick; if they were not fit for brick, use them for something else. That is the condition that has to be reconciled. Whether this clause that I have just read is in line with the Car Service Commission's idea I do not know. If circular No. 7 is to prevail, it will help the mechanical departments out of their trouble somewhat.

The grain car repairing situation is not the whole problem. Cars are repaired at points where there are no shop facilities. For handling home cars the material is framed and shipped out to these points in car-load lots. Today that condition is entirely changed. You can't frame material in advance. At large repair tracks with no facilities you have to handle the individual foreign car as it comes; either frame the material by hand or wait to send to shop points and get it framed. The output of repaired cars is reduced enormously on account of that one condition.

There is another condition. All of us have certain cars that we were re-enforcing. On the Chicago & North Western we are putting on cast steel draft arms and changing the draft gear on some 12,000 cars. We have material piled up that we have no use for because we do not have those cars on our line. The foreign roads cannot carry a stock of that material and repair those cars as they get them because that would tie up an untold amount of money. Those cars should not be continued in service in their present condition. They have short draft timbers and will not stand modern service. If we are not going to get our cars back we are not going to be able to improve the equipment of the country as it should be improved and as most roads are and have been arranging for during the past five or six years.

Cars that have been used in the east in loading steel and steel products would continue in that service without repairs but the minute those cars go to the northwest for grain, if there is a post shoved away or a splinter out of the floor so

there is a hole in it, they must be repaired. No one road has the facilities to repair a lot of cars unloaded on it within a few weeks' time and get them distributed to the elevators. It is very necessary that the roads as a whole in all sections of the country help in putting cars in condition for grain. If circular No. 7, clause 6, is to apply, then we probably will be in a position somewhat to enforce that through the refusal of unserviceable cars when offered in interchange.

F. W. Brazier (New York Central): If you went out in your yards and inspected foreign cars as closely as you do your own, instead of having five per cent or 6 per cent bad order cars you would have 25 per cent, and the sooner that is generally known the better. We are up against a serious problem on the rate we are paying our men. It is impossible to hold men at the rates the railroads pay when the men in ammunition plants and common street laborers are getting better rates. It is impossible to get any long yellow pine for sills. We are splicing everything and anything. I want to call attention to the repairs of foreign cars. We are all government employees now, trying to help the government out. We have got to make our shops repair all classes of cars. We have started to do so on the New York Central. Right or wrong, we are going to put on anything we can to get the cars in safe and serviceable condition.

J. J. Hennessey (C. M. & St. P.): Every road should make an effort to put its own cars in better condition than they are now. I realize that we are only divisions of the American railroad, but every road can repair its own cars in better shape and for less money than can a foreign road. It has the material on hand, framed and ready to put on. If we would all make an effort to put our cars in first class condition before they leave the home road we would not have such a congestion of cars as we are having today.

I want to endorse the proposal that no cars should be accepted unless they are serviceable for the commodity they are ordered for.

I. S. Downing (C. C. C. & St. L.): Our men are being taken by the war. We can't replace them. It is going to be impossible to repair any more cars than we have been repairing. I do not believe in hauling whole trainloads of pine lumber to the north to repair wood underframe cars. Even if the Government had to build shops in the South for the purpose of putting wooden underframes under the cars, it would be a better investment than to haul the lumber north, then haul the cars north and put the wooden underframes under them and then haul them all back south for loading. Those light capacity cars should be kept in the section where they have the material. In the north we handle heavier trains. On our division from Indianapolis to Cleveland we had 15 ends pull out in one day, draft timbers and all, on classes of cars that probably all roads are re-enforcing.

Another thing that has increased this bad order situation is the fact that most of the roads have cars standing on their side tracks that they were going to dismantle. In 1916 we tore down something like 1,700 cars. We would have torn down just that many more in 1917, but instead of doing that we put them in service. In 1916 and 1915 we could not get force enough to repair those cars and we can't get it now. I am not opposed to contract shops, but it has been my experience that every time we give a contract shop a lot of cars to repair, they take our men. Until our own facilities are worked to capacity we should not let cars to contract shops. If we would start right now in the transportation department to send every car that comes out of the shop fit for grain in the direction of the roads that have the big grain loading, we will get enough cars in the west. I don't believe that all of our equipment is in a rundown condition but we are not going to be able to get men and material enough to repair all of these cars which are in such bad condition. The impression seems to prevail that a car repairer can be made in about three weeks. You cannot make a first class car repairer under three or four years. Women are not satisfactory in this class of work. We are trying them, but a woman cannot do that kind of work.

In view of the fact that we cannot get men to keep up even our ordinary running repairs, we ought not to have to spend money on repairs for cars to haul grain when standing in our freight houses there are cars in which they are loading steel and other commodities, that are suitable for the loading of grain, and the steel and other commodities could be loaded in the same cars we are trying to repair.

J. H. Milton (C. R. I. & P.): We are making every effort possible to take care of foreign equipment. In the last two months our repairs on foreign cars have increased about 75 per cent. We have on our railroad between fifteen and eighteen shops doing heavy repairs. We find in doing work on the cars of other roads, that if a car has a drawbar or draft-arm pulled out, a drawbar or draft arm is put into the car, without doing the other work that should be done at the same time; the car goes through ten or twelve transfers and the last road that receives it is the one which has to do the work on it. We are taking out side and end sills and putting in posts and braces, and doing everything that possibly can be done to get the cars in condition to haul the freight they are intended to haul.

J. C. Fritts (D. L. & W.): The conditions in the east are nearly as bad as they are in the west. We meet the same conditions in regard to the loading of coal that the western roads are going to meet in loading grain. What has brought about this condition? Certainly, to a large extent, the pooling of equipment. From a transportation standpoint that is easy to do, but from a maintenance standpoint it is a difficult proposition. Every car man in this country ought to put his shoulder to the wheel, and the Government can rightly expect some advice from this Association, which has been handling the car problem for the last 50 years. We have a lot of so-called foreign cars on our road that are in very bad shape, and as near as I can find out every other road is in the same condition. We have reduced our repair output at least 30 per cent on account of the so-called foreign car situation throughout the country. The re-enforcement of cars has been entirely stopped. We have any amount of trouble pulling ends out of cars with short draft sills. We are loading cars heavier than we have ever done before in the history of the road, and pulling longer trains, and consequently we must repair the cars to meet these new conditions.

It has never been possible, and never will be, to have all cars in such shape that they will handle commodities of all kinds. Therefore when a body of cars moves under Commission order, designation should be made as to what they are going to be loaded with so that an inspection can be made and the bad cars sorted out and diverted to other traffic. That will relieve a lot of empty hauling, and a congestion of cars in bad order in sections where a large movement of a certain kind of commodity is to be handled.

By centralizing material we can bring about much economy in operation. If we had one point in Chicago, one in New York, one in Buffalo and at other convenient places, where we could keep material for these various foreign cars, and where we could get it in case we had a foreign car on our tracks that needed repairs of an unusual character, we could make the proper repairs. The present practice will never bring about the results that are looked for.

Cars should be delivered direct to the original owning road when they are in bad order. When they cannot be returned directly arrangements should be made by the transportation department to load them to the original road, or a road that can deliver them direct. In that way we can get rid of a lot of cars we are now holding for material and on which we have to make wrong repairs.

I wish to call attention to the air brake situation.

We are cleaning 10 per cent more cars than before and still I find hundreds of cars on our line which are out of date. That indicates to me that some road is not doing what it ought to do. If this practice is continued we will be in serious shape on the mountains in handling trains next winter.

C. E. Chambers (C. R. R. of N. J.): The reason that the air brakes have not been cleaned as frequently as they should be is that we have not had the men to take care of the work. The reason you do not put on re-enforcements on short draft cars is that you do not have the men and material. Foreign bad order cars must be put in serviceable condition including the safety appliances. Many times you do not have to repair a car so as to make it serviceable for carrying grain, but you can make it serviceable for rough freight. When the car goes to a road which has to use the car for carrying grain that road must repair the car and make it suitable for that purpose.

Action Taken

The meeting adopted the following resolutions concerning the handling of cars with the suggestion that they be forwarded to the Railroad Administration at Washington for consideration.

The first resolution was: "It is the recommendation of this association that cars ordered from one part of the country to another or from one road to another on authority of the Car Service Commission for designated loading shall first be inspected by representative of the mechanical department of the road furnishing the cars as to their fitness for the loading intended and be side-carded showing that they have been passed as O. K. for it, otherwise cars can be rejected when offered unless it has been specially arranged to send bad order cars."

The second resolution included several recommendations, varying widely in character but all intended to facilitate traffic, as follows:

"First, that if possible, cars of wooden underframe construction that have not been reinforced be confined to home roads and kept off of trunk line railroads with heavy grades where heavy tonnage trains are handled.

"Second, that all loads must be loaded strictly in accordance with the M. C. B. loading rules within the clearance dimensions of the roads over which the cars route, and no cars will be moved from the loading point unless so loaded.

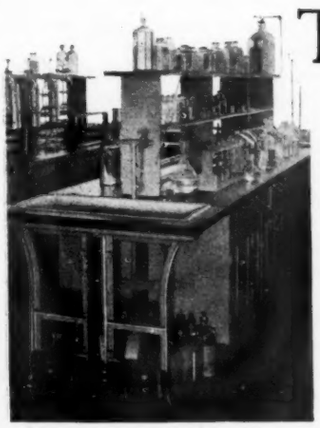
"Third, that all unloaders will be held strictly accountable for any damage done to cars in unloading. This applies to damage to cars in unloading machines as well as damage such as tearing out cross tie braces of open cars, etc., resulting from unloading bulk lading with machinery.

"Fourth, that in the repairs of cars the M. C. B. standards and rules governing the maintenance of air brakes must be strictly followed out when cars are on repair, classification or other tracks, so that the air and hand brakes of such cars will be in proper condition for handling on grades.

"Fifth, that the coupling speed of all cars and locomotives should not exceed a reasonable speed for safety.

"Sixth, that railroads are hereby required to carry in stock castings and other materials standard to their cars for which substitution cannot be made or which cannot be purchased in the open market."

Specifications and Tests for Materials



A Corner of a Chemical Laboratory

THE COMMITTEE report covers the different subjects which were reviewed during the past year and recommends that changes be made in the several specifications, as shown under the respective exhibits.

Exhibit A.—Specifications for Steel Axles

1. SECTION 5.—**Drop Tests.**—Change to read as follows:

"(a) The test axle shall be so placed on supports 3 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture five blows from a tup of 2,240 lb. falling from a height as specified, and the permanent set produced by the first blow shall not exceed that specified for axles of corresponding dimensions, as shown in the following table. The axle shall be turned through 180 deg. after the first and third blows.

"(b) The permanent set is the difference between the distance from the straight-edge to the middle point of the axle measured before the first blow and the distance measured in the same manner after the blow. The straight-edge shall rest only on the collars or ends of the axle.

"(c) The temperature of the axle, when tested, shall be between 40 and 120 deg. F."

2. **Table.**—Omit the words "Weight of Tup, 2,240 lb. Supports 3 ft. Apart," and the words "Result of First Blow" shown in last column, and add to the table a column, under "Size of Axle, In." with the heading "Length Overall, In." and "84¼, 86½, 88½, 90¾," for axles having journals 4¼ by 8, 5 by 9, 5½ by 10 and 6 by 11 in. respectively.

3. SEC. 10.—**Permissible Variation.**—Change the tolerance for excess length overall, from 3/32 in. to 1/8 in.

Exhibit B.—Specifications for Mild Steel Bars for Passenger and Freight Equipment Cars

1. SEC. 10.—**Number of Tests.**—(a) Change to read as follows:

"One tension and one bend test shall be made from each melt; except if material from one melt differs ⅜ in. or more in thickness or diameter, one tension and one bend test shall be made from both the thickest and the thinnest material rolled. When the material from separate melts cannot be identified, one sample shall be taken from each lot of 30,000 lb. or fraction thereof. When the bars in any lot are not all of the same diameter or thickness, samples shall be taken so as to represent each size differing in diameter or thickness by ⅜ in., and in all cases the thickest and the thinnest sections shall be represented."

2. SEC. 11.—**Permissible Variations.**—Change to read as follows:

"All bars shall conform to the limits given in the following table."

(Add the following table, to supersede present Table No. 1 and Paragraph (b) Flat Bars.—(1) and (2), M. C. B.

1917 Proceedings, page 827, and M. M. 1916 Proceedings, page 603.)

ROUNDS, SQUARES, HEXAGONS.

Size.	Variations in Size. Under.	Over.
Up to and including ½ in.	.007 in.	.007 in.
Over ½ in. and including 1 in.	.010 in.	.010 in.
Over 1 in. and including 2 in.	1/64 in.	1/32 in.
Over 2 in. and including 3 in.	1/32 in.	3/64 in.
Over 3 in. and including 5 in.	1/32 in.	3/32 in.
Over 5 in. and including 8 in.	1/16 in.	⅛ in.

FLATS.

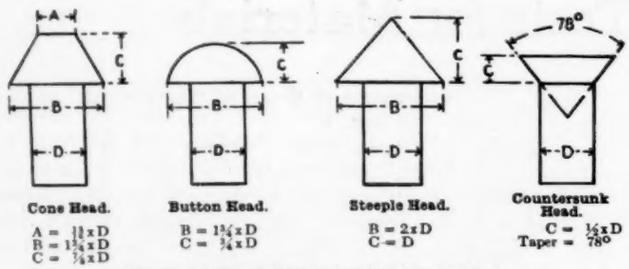
Width of Flats.	Variation in Width. Under.	Over.	Thickness of Flats. Variation in Thickness, Under and Over. 3/16 in. and under.	Over 3/16 in. up to ½ in.	Over ½ in. up to 1 in.	Over 1 in. up to 2 in.
Up to and including 1 in.	1/64 in.	1/32 in.	.006 in.	.008 in.	.010 in.	.....
Over 1 in. up to and including 2 in.	1/32 in.	3/64 in.	.008 in.	.012 in.	.015 in.	1/32 in.
Over 2 in. up to and including 4 in.	3/64 in.	1/16 in.	.010 in.	.015 in.	.020 in.	1/32 in.
Over 4 in. up to and including 6 in.	1/16 in.	3/32 in.	.010 in.	.015 in.	.020 in.	1/32 in.

Exhibit C.—Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars

1. SEC. 5.—**Number of Samples for Chemical Analysis.**—Omit the words "for Chemical Analysis," and also omit the words, forming the last sentence of Paragraph (a), "These samples shall be used for check analysis by the purchaser."

2. SEC. 19.—Change to read as follows:

"Dimensions of Head. Rivet heads shall conform to the dimensions shown on the purchaser's standard drawings, when so specified, otherwise the heads shall conform, within five per cent above or below, to the dimensions shown in Table No. 2."



Cone Head. A = 1⅛ x D, B = 1¾ x D, C = ¼ x D

Button Head. B = 1¼ x D, C = ¾ x D

Steeple Head. B = 2 x D, C = D

Countersunk Head. C = ½ x D, Taper = 78°

Proportions of Standard Rivet Heads

(Add the following table and formula, to supersede the present Table No. 2 page 831, M. C. B. 1917 Proceedings; page 607, M. M. 1916 Proceedings.

TABLE II.

DIMENSIONS FOR RIVETS.

Diam. of Rivet. D	Cone Head. A	B	C	Button Head. B	C	Steeple Head. B	C	Countersunk Head. C
1/4	15/64	7/16	7/32	7/16	3/16	1/2	1/4	1/8
5/16	19/64	35/64	9/32	35/64	15/64	5/8	5/16	5/32
3/8	23/64	21/32	21/64	21/32	9/32	3/4	3/8	3/16
7/16	27/64	49/64	25/64	49/64	21/64	7/8	7/16	7/32
1/2	15/32	7/8	7/16	7/8	3/8	1	1/2	1/4
9/16	17/32	63/64	1/2	63/64	27/64	1 1/8	9/16	9/32
5/8	19/32	1 3/32	35/64	1 3/32	15/32	1 1/4	5/8	5/16
11/16	41/64	1 13/64	39/64	1 13/64	33/64	1 3/8	11/16	11/32
3/4	45/64	1 5/16	21/32	1 5/16	9/16	1 1/2	3/4	3/8
13/16	49/64	1 27/64	23/32	1 27/64	39/64	1 5/8	13/16	13/32
7/8	53/64	1 17/32	49/64	1 17/32	21/32	1 3/4	7/8	7/16
15/16	7/8	1 41/64	53/64	1 41/64	45/64	1 7/8	15/16	15/32
1	15/16	1 3/4	7/8	1 3/4	3/4	2	1	1/2
1 1/16	1	1 55/64	15/16	1 55/64	51/64	2 1/8	1 1/16	17/32
1 1/8	1 1/16	1 31/32	63/64	1 31/32	27/32	2 1/4	1 1/8	9/16
1 3/16	1 1/8	2 5/64	1 3/64	2 5/64	57/64	2 3/8	1 3/16	19/32
1 1/4	1 11/64	2 3/16	1 3/32	2 3/16	15/16	2 1/2	1 1/4	5/8
1 3/8	1 9/32	2 13/32	1 13/64	2 13/32	1 1/32	2 3/4	1 3/8	11/16
1 1/2	1 13/32	2 5/8	1 5/16	2 5/8	1 1/8	3	1 1/2	3/4
1 3/4	1 41/64	3 1/16	1 17/32	3 1/16	1 5/16	3 1/2	1 3/4	7/8
2	1 7/8	3 1/2	1 3/4	3 1/2	1 1/2	4	2	1

Exhibit D.—Specifications for Heat-Treated Knuckle Pivot Pins for Passenger and Freight Equipment Cars

1. SEC. 3.—**Chemical Composition.**—Omit the lower limit for manganese, 0.40, and change to read: "Manganese, not over 0.60 per cent."

2. SEC. 6.—**Drop Tests.** Change to read as follows: "This test shall be made on a standard M. C. B. drop-test machine (see Plate 29-D), the pins resting on rounded supports held rigidly 10 in. center to center, shall be subjected to one blow by a 1,640-lb. tup dropping from a height of 3 ft., or a 2,240-lb. tup dropping from a height of 2¼ ft. and shall show a deflection of not less than 15 deg. or more than 30 deg., without cracking or breaking."

Exhibit E.—Specifications for Air-Brake and Train Air-Signal Hose

1. SEC. 3.—**Tests.** Change to read as follows:

"Hose shall be subjected to the following tests, which shall be made with the temperature of the air not lower than 65 or higher than 90 deg. F., and the samples shall be kept at a temperature within these limits for at least one-half hour previous to the time of test."

Exhibit F.—Specifications for Welded Pipe

1. SEC. 4.—**Flattening Test.** Change to read as follows:

"For steel pipe over 2 in. in diameter, a section 6 in. in length shall be flattened until the distance between the plates is one-third the outside diameter of the pipe, with the weld located 45 deg. from the line of direction of the applied force, without developing cracks."

2. Add a new Section 5, to read as follows, and renumber subsequent sections accordingly:

"5. **Fracture Test.**—For wrought-iron pipe, a section 6 in. in length shall be flattened until broken by repeated blows of a hammer or by pressure; the fracture developed shall have a fibrous appearance."

3. Change present Section 5 to read as follows:

"6. **Bend Test.**—For wrought iron or steel pipe 2 in. or under in diameter, a sufficient length of pipe shall bend cold through 90 deg. around a cylindrical mandrel, the diameter of which is 15 times the nominal diameter of the pipe, without developing cracks at any portion and without opening in the weld."

4. Change present Section 9 to read as follows:

"10. **Workmanship.**—For pipe 1½ in. in diameter or under, the outside diameter at any point shall not vary more than 1/64 in. over nor more than 1/32 in. under the standard. For pipe 2 in. in diameter or over, the outside diameter shall not vary more than one per cent over or under the standard. All pipe shall be provided with the prevailing standard thread which shall make a tight joint when tested to the internal hydrostatic pressure at the mills. The threads shall not vary more than 1½ turns either way when tested with a Pratt & Whitney standard gage. All burrs at the end of the pipe shall be removed."

Exhibit G.—Specifications for Air-Brake Hose Gaskets

1. The following revision to supersede the present specifications:

1. **Scope.**—These specifications cover all gaskets for use in air-brake and air-signal hose couplings.

2. **Material.**—Gaskets shall be made of a rubber compound that will be tough and have enough elasticity to conform to the requirements for strength and elongation, and that the gasket can be readily applied in the couplings under all service conditions and form an air-tight seat.

3. **Deflection Test.**—(a) Gaskets shall be subjected to

a deflection test by suspending a weight of 20 lb. on the gasket. Under this load the increase in the inside diameter shall not exceed 7/8 in., the measurement to be taken on the inside of the gasket within 15 to 20 seconds after the application of the load, with the load applied. The support and the hook to which the weight is attached shall each have a diameter of 1/4 in.

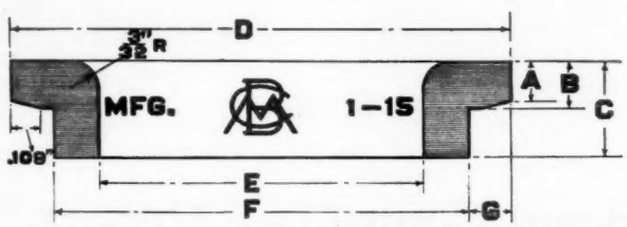
(b) When the deflection test has been completed the gaskets shall be allowed to relax, before subjecting them to the tension test, for a period of not less than 15 minutes.

4. **Tension Test.**—Gaskets shall be subjected to a tension test by inserting into the gasket two semi-circular blocks, each having a 180-leg. fillet of the same radius as the original inner radius of the gasket, and pulled at a speed of 20 in. per minute. Under this test the gasket shall show a minimum tensile strength of 90 lb. and a minimum elongation of 200 per cent.

5. **Test Specimens.**—Deflection and tension test specimens shall be the finished gasket and tests shall be made with the temperature of the air not lower than 65 or higher than 90 deg. F., and the specimens shall be kept at a temperature within these limits, for at least one-half hour previous to the time of test.

6. **Number of Tests.**—(a) One deflection and one tension test shall be made on each of five gaskets selected, to represent each lot of 1,000 gaskets or fraction thereof.

(b) Not less than 80 per cent of the gaskets tested shall conform to the requirements of both the deflection and tension tests.



	A	B	C	D	E	F	G
Nominal	9/64	11/64	11/32	1 13/16	1 3/16	1½	5/32
Minimum	.140	.171	.343	1.800	1.16	1.49	.150
Maximum	.150	.181	.353	1.825	1.19	1.52	.158

Standard Air Brake Hose Gasket

7. **Dimensions.**—All gaskets shall conform, within the minimum and maximum tolerances, to the nominal dimensions shown in Fig. 1, and as adopted by the association in 1911.

All gaskets shall be uniform in size and section.

3. **Workmanship.**—The gaskets shall be free from fins and surface defects.

9. **Marking.**—All gaskets shall have the manufacturer's name or trade mark, M. C. B. standard monogram and the date when made legibly marked on the inside edge, as shown in Fig. 1.

11. **Rejection.**—(a) Gaskets represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Gaskets which, subsequent to test and inspection at the factory or elsewhere and their acceptance, show defects or imperfections will be rejected and shall be replaced by the manufacturer.

Exhibit H.—Specifications for Structural Steel, Steel Plate and Steel Sheets for Passenger Equipment Cars

(1) SECTION 3.—**Chemical Composition.** Change the sulphur content from 0.05 to 0.06 per cent.

(2) SEC. 11.—**Permissible Variations.**—Change to read as follows:

"(a) The cross-section, or weight per lineal foot of shapes shall not vary more than 2.5 per cent from that specified.

"(b) **When Ordered to Weight per Square Foot.**—The weight of each lot[1] of sheets in each shipment shall not vary from the weight ordered more than the amount given in Table I. One cubic inch of steel is assumed to weigh 0.2833 lb.

"(c) **When Ordered to Thickness.**—The thickness of each sheet shall not be more than 0.01 in. under that ordered. The overweight of each lot[2] of sheets in each shipment shall not exceed the amount given in Table II.

"(d) A variation from the length ordered of 1/8 in. under and 1/4 in. over will be permitted for sheets or shapes under 12 ft. in length, and a variation of 1/4 in. under and 1/2 in. over will be permitted for sheets or shapes 12 ft. and over in length."

Exhibit I.—Specifications for Structural Steel, Steel Plate and Steel Sheets for Freight Equipment Cars

(1) SECTION 3.—**Chemical Composition.** Change the sulphur content from 0.05 to 0.06 per cent.

TABLE I.—PERMISSIBLE VARIATIONS OF PLATES ORDERED TO WEIGHT.

PERMISSIBLE VARIATIONS IN AVERAGE WEIGHTS PER SQUARE FOOT OF PLATES FOR WIDTHS GIVEN, EXPRESSED IN PERCENTAGES OF ORDERED WEIGHTS.

Ordered Weight, Lb. per Sq. Ft.	Under 48 In. Over.	Under.	48 to 60 In., Excl. Over.	Under.	60 to 72 In., Excl. Over.	Under.	72 to 84 In., Excl. Over.	Under.	84 to 96 In., Excl. Over.	Under.	96 to 108 In., Excl. Over.	Under.	108 to 120 In., Excl. Over.	Under.	120 to 132 In., Excl. Over.	Under.	132 In. or Over Over.	Under.	Ordered Weight, Lb. per Sq. Ft.
Under 5.....	5	3	5.5	3	6	3	7	3	...	...	...	...	...	...	...	...	...	...	Under 5
5 to 7.5, excl....	4.5	3	5	3	5.5	3	6	3	...	...	...	...	...	...	...	...	...	...	5 to 7.5, excl.
7.5 to 10, excl...	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3	...	...	...	...	7.5 to 10, excl.
10 to 12.5, excl...	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3	9	3	10 to 12.5, excl
12.5 to 15, excl..	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3	8	3	12.5 to 15, excl
15 to 17.5, excl..	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	7	3	15 to 17.5, excl
17.5 to 20, excl..	2.5	2	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	6	3	17.5 to 20, excl.
20 to 25, excl....	2	2	2.5	2	2.5	2.5	3	2.5	3.5	2.5	4	3	4.5	3	5	3	5.5	3	20 to 25 excl
25 to 30, excl....	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3	4.5	3	5	3	25 to 30, excl.
30 to 40, excl....	2	2	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3	4.5	3	30 to 40, excl.
40 or over.....	2	2	2	2	2	2	2	2	2.5	2	2.5	2.5	3	2.5	3.5	3	4	3	40 or over.

NOTE.—The weight per square foot of individual plates shall not vary from the ordered weight by more than 1 1-3 times the amount given in this table.

[1] The term "lot" applied to Table I means all of the plates of each group width and group weight.

[2] The term "lot" applied to Table II means all of the plates of each group width and group thickness.

TABLE II—PERMISSIBLE OVERWEIGHTS OF PLATES ORDERED TO THICKNESS.

PERMISSIBLE EXCESS IN AVERAGE WEIGHTS PER SQUARE FOOT OF PLATES FOR WIDTHS GIVEN, EXPRESSED IN PERCENTAGES OF NOMINAL WEIGHTS.

Ordered Thickness In.	Under 48 In.	48 to 60 In., Excl.	60 to 72 In., Excl.	72 to 84 In., Excl.	84 to 96 In., Excl.	96 to 108 In., Excl.	108 to 120 In., Excl.	120 to 132 In., Excl.	132 in. or Over.	Ordered Thickness, In.
Under 1/8	9	10	12	14	....	....	....	....	....	Under 1/8
1/8 to 3-16, excl.	8	9	10	12	....	....	....	....	....	1/8 to 3-16, excl.
3-16 to 1/4, excl.	7	8	9	10	12	....	....	....	....	3-16 to 1/4, excl.
1/4 to 5-16, excl.	6	7	8	9	10	12	14	16	19	1/4 to 5-16, excl.
5-16 to 3/8, excl.	5	6	7	8	9	10	12	14	17	5-16 to 3/8, excl.
3/8 to 7-16, excl.	4.5	5	6	7	8	9	10	12	15	3/8 to 7-16, excl.
7-16 to 1/2, excl.	4	4.5	5	6	7	8	9	10	13	7-16 to 1/2, excl.
1/2 to 5/8, excl.	3.5	4	4.5	5	6	7	8	9	11	1/2 to 5/8, excl.
5/8 to 3/4, excl.	3	3.5	4	4.5	5	6	7	8	9	5/8 to 3/4, excl.
3/4 to 1, excl.	2.5	3	3.5	4	4.5	5	6	7	8	3/4 to 1, excl.
1 or over	2.5	2.5	3	3.5	4	4.5	5	6	7	1 or over

(1) SEC. 8.—**Permissible Variations.** Change to read as follows:

"(a) The cross-section, or weight per lineal ft. of shapes shall not vary more than 2.5 per cent from that specified.

"(b) **When Ordered to Weight per Square Foot.**—The weight of each lot[1] of sheets in each shipment shall not vary from the weight ordered more than the amount given in Table No. I. One cubic inch of steel is assumed to weigh 0.2833 lb.

"(c) **When Ordered to Thickness.**—The thickness of each sheet shall not be more than 0.01 in. under that ordered. The overweight of each lot[2] of sheets in each shipment shall not exceed the amount given in Table II.

"(d) A variation from the length ordered of ⅛ in. under and ¼ in. over will be permitted for sheets or shapes under 12 ft. in length, and a variation of ¼ in. under and ½ in. over will be permitted for sheets or shapes 12 ft. and over in length."

The report is signed by C. D. Young, chairman, Pennsylvania; J. R. Onderdonk, B. & O.; J. J. Birch, N. & W.; I. S. Downing, C. C. C. & St. L.; Frank Zeleney, C. B. & Q.; A. H. Fetters, Union Pacific; H. B. MacFarland, A. T. & S. F.; G. S. Sprowle, A. C. L.; and H. G. Burnham, Northern Pacific.

Discussion

F. M. Waring (P. R. R.): In the specification for rivet steel there is a change in the clause for chemical analysis to make the meaning clear and a new table for dimensions of rivet heads. In the specification for air brake and signal hose the only change made was the insertion of a paragraph in reference to the temperature at which the test pieces shall be tested. The specification for air brake hose gaskets has been changed as to form and also as to substance in regard to the deflection tests and slightly different requirements inserted. A change in the specification for steel plates was made in the sulphur content raising it from .05 to .06 per cent and inserting a table of permissible variations in thickness and over-weight. In the specifications for structural steel for freight cars, the same changes were made as in the structural steel for passenger cars.

Action Taken

J. J. Burch (N. & W.): *I move that Exhibit J be withheld.* Since getting up the report the government has issued a specification covering cast steel side frames and truck bolsters which in some respects conflicts with this and I think we should withhold our recommendation.

Mr. Waring: I believe that such a motion would find favor with the committee.

I. S. Downing (C. C. C. & St. L.): Is it the idea to adopt the government specification which is an expedient and lessen our quality of materials and what we really should have? Shouldn't we go on with our specifications and make them as they should be and then accept the exception that has got to be made with war material? If you take tin out of your journal bearings, which they have told us to do now, we have an idea that the lining will be pretty soft. We know we can't get the tin and we want to comply with their instructions, but we don't want to go on record making specifications for journal bearings without the tin lining that would make them too soft.

Mr. Waring: I think the committee would like to review this subject. In the opinion of the majority of the committee perhaps something better than the present government specifications is to be desired. I don't think there is the slightest intention on the part of the committee to put in an inferior grade of material; in fact, the tendency is all the other way.

Mr. Burch's motion was carried.

Brake Shoe and Brake Beam Committee Report

C. D. Young
Chairman

OWING TO THE EXISTING conditions arising from the national crisis, this committee has only been able to meet once this year. The committee agreed that, with the exception of one item, namely, the addition of dimensions on the brake head gage, as shown on M. C. B. sheet 17, it would report progress for the year 1918. The following items which were up for consideration, and by correspondence, through the year:

The committee recommends that M. C. B. sheet 17, "Standard Brake Head, Shoe and Key-Standard Gages for Brake Head and Shoe" be changed as follows:

(a) A radius of 5/32 in. to be shown at each corner of the gage where it enters the toe of the head, and that the open dimension (marked *K*) should be changed from 1 5/16 in. to 1 3/16 in.; this change is made to provide the proper clearance for the gage entering the head.

(b) That there should be shown on this same gage a dimension of 1 ¼ in. for the width of the head where the gage enters, and that a ⅛ in. radius should be shown at the intersection of the sloping line with the bottom of the fork at the upper and lower toe openings of the head.

The above two items are to be submitted to letter ballot as new standards.

The following subjects are before the committee at the present time for their consideration, and upon which the committee reports progress:

First.—The committee is investigating the desirability of modifying the present standard brake beam gage as shown on M. C. B. sheet 17-A, with a view of simplifying the gage and reducing its cost; the new gage to provide for checking substantially the same dimensions and angles as the present gage.

Second.—M. C. B. sheet 17 shows a new standard contour for brake head. The question of a modification of this contour to meet foundry practices, as recommended by brake beam manufacturers, is being considered. The committee is awaiting its final decision for additional information, and to ascertain what, if any, action is taken by the Railway Administration in providing a new brake head for the cars being purchased this year.

Third.—The present Recommended Practice M. C. B. sheet *R* shows the recommended practice for No. 2 Brake Beam. The committee is considering, in connection with this beam, the location and design of two upper hanger openings as shown in dotted lines on this sheet, in order to provide a more satisfactory bearing area for the openings to meet certain requirements in foundry practice, as suggested

by the manufacturers. The committee is also considering a modification in the vertical location of the center hanger openings with reference to the radial line of the brake beam to the truck axle, and has received recommendations from the manufacturers on this subject, which, if accepted, will modify the present dimensions as shown on M. C. B. sheet *R*.

Fourth.—The committee is considering, in conference with the manufacturers, a change in the face dimensions of the brake head as shown on M. C. B. sheet 17, in which a bearing area of 1⅜ in. is provided for the brake head where it bears against the brake shoe, and is also considering the restoration of the 3/16 in. clearance in the 17¾ in. dimension which was made standard last year.

The report is signed by: C. D. Young, chairman, P. B. & W.; Prof. Chas. H. Benjamin, Purdue University; T. L. Burton, N. Y. C.; C. B. Young, U. S. Railroad Administration; C. H. Bilty, C. M. & St. P.; G. H. Gilman, Nor. Pac.; and T. J. Burns, Mich. Cent.

Action Taken

There was no discussion. The report was accepted and submitted to letter ballot.

Welding Truck Side Frames, Bolsters and Arch Bars

W. O. Thompson
Chairman

In accordance with the action taken by the association at the 1916 convention, this subject was referred to the Executive Committee with the recommendations that the views of the majority of the committee prevail, that a special committee be appointed to investigate the subject and determine the possibilities and limitations of this practice with reference to truck sides and bolsters, and that if welding is permitted certain specific instructions shall be framed as to how the work shall be performed to produce the result desired and to bring the structure up to a proper condition for service. One member of the committee dissented from the report made in 1916.

The committee arranged to have failed and welded side frames and bolsters shipped to two manufacturers, where suitable facilities were provided for conducting the tests, 23 of which were made at the Bettendorf Company's plant. Bettendorf, Iowa, and 21 at the American Steel Foundries plant, Alliance, Ohio. A 1,500-ton hydraulic press was used for this purpose at Bettendorf and a Riehle testing machine of one million pounds capacity at Alliance, Ohio.

The general arrangement of the machines and the manner in which the tests were made to determine the strength of welds, also the views and data of each individual piece tested, are shown in photo views folios *A* and *B*. Each member of the committee and the secretary of the association have been furnished copies. [See the résumé of the data in folios *A* and *B* given at the conclusion of the report.—Editor.]

The committee in preparing this report have endeavored specifically to mention and illustrate the results obtained welded material by submitting the following tests:

Test No. 3: Book "A." Andrews Steel Side Frame

This frame was received from the railway to be welded by the manufacturer. The frame had a crack in the tension member 3¾ in. long, as shown in Fig. 1, and for the information of the committee was tested without welding, as it was a good sample of a frame that would be considered unsafe and would not be accepted under load in interchange. Under a load of 195,000 lb. the crack opened slightly, under a load of 230,000 lb. the crack opened ⅛ in., and under a load of 259,000 lb. the tension member broke as shown in Fig. 2.

Test No. 8: Book "A." Andrews Side Frame

This frame was removed from a truck by the railway, due to a crack 1½ in. long in the tension member. It was placed in the machine and tested without being welded, fracture taking place under load of 332,000 lb.

From the described tests and the data contained in Books *A* and *B*, it is evident that the art of welding, which has formerly been defined as a process of uniting two pieces of metal by hammering them together while hot, may be safely extended to the joining of two pieces of metal by fusion.

In one of the committee reports on this subject (1916) the position was taken that fractures indicate weakness in the design of cast steel truck side frames and bolsters, and the welding would not add to the strength, but introduce a condition of further weakness by improper workmanship, thereby introducing another chance for failure. This is truly a bad combination and applies equally to other parts of cars, either of cast steel, rolled or pressed sections when built into a design inherently weak.

In this report the designs were not taken into consideration, for the reason that they were made by engineers skilled in car construction employed by the railroads and manufacturers and approved by superior officers before being specified. When cracks or failures occur, due to a poor quality of metal, track conditions, overloading of cars, bolster springs too weak and going solid, or other causes, the frames and

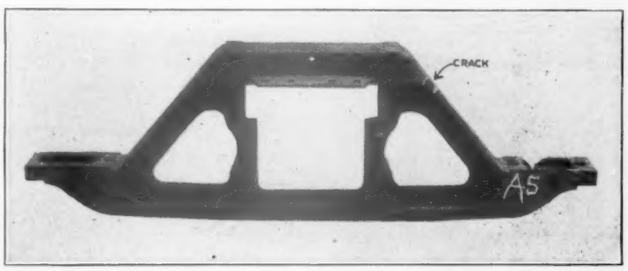


Fig. 1—Book A, Test 3. Side Frame Before Testing. Cracks 3¾ Inches Long

bolsters are subjected to greater loads and stress than that for which they were designed.

The frame shown in Fig. 1 had a crack 3¾ in. long, yet under tests did not show signs of opening until a load of 195,000 lb. was applied, and opened ⅛ in. under a load of 230,000 lb. The frame used in Test No. 8 Book *A*, with a crack 1½ in. long, took a load of 332,000 lb. before the fracture occurred. Any methods employed in welding or preventing cracks of this character from extending would permit the frame to remain in service with safety, as it is only in isolated cases that frames ever failed without giving sufficient

warning that by ordinary inspection replacement or repair could be made to prevent accident or derailment. In many cases they have been kept in service until the crack commenced to open or extend into the vertical section before removal and without anxiety on the part of mechanical officers responsible for their performance.

A number of the castings tested were welded where broken entirely across the tension member, yet the welds were sufficiently strong so that under test, the casting broke at some location other than the weld. Therefore, the proper welding of side frames and bolsters should be permitted, the limit to

Fig. 2—Book A, Test 3. Side Frame Broken Through Crack. Breaking Load, 259,000 Lb.

prohibit welding to be when the strength of the weld would not equal that of the joining sections.

The committee invites your careful consideration of the following in all autogenous welding:

Selection of Operations

First.—Experience has shown that an ordinary helper, handy-man or laborer is not possessed of the ability to make proper welds, as they are not conversant with the changes which metals undergo while being welded. A competent mechanic should be selected and given the necessary instruction by an experienced welder before being assigned to this important work. When the desired proficiency has been acquired, the operator's ability should be certified to by the mechanical officer in charge or by an instructor qualified by

dation should be made by a competent operator or instructor.

Third.—Great care should be exercised to prevent welding under load becoming a general practice for the reason that internal strain is liable to be set up through welding, which

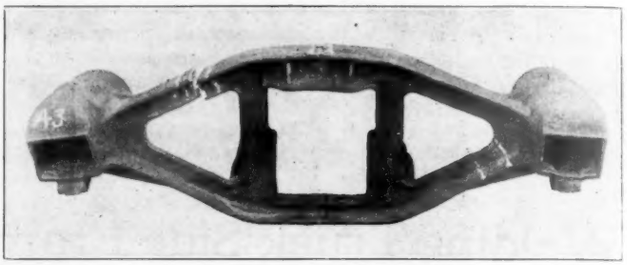


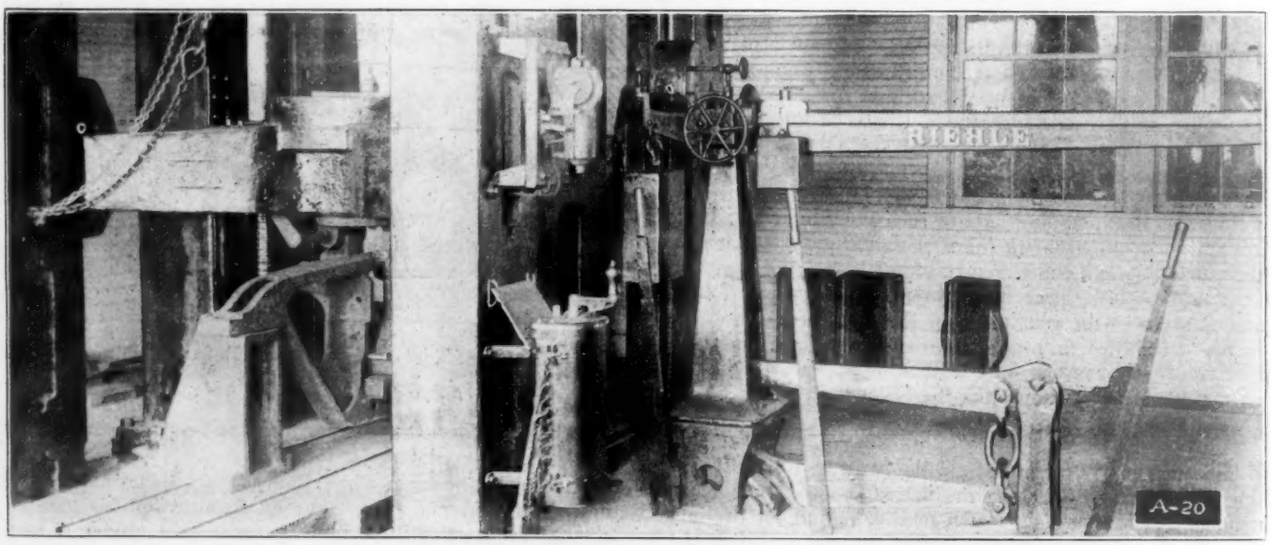
Fig. 3—Book A, Test 9, Side Frame Broken Through Weld. Breaking Load, 149,600 Lb.

can be avoided by preheating. Therefore, it is considered good shop practice to preheat cast steel and pressed form bolsters and side frames and this should be done whenever possible.

Fourth.—In making the weld the fracture should be cut

Fig. 4—Book A, Test 16. Truck Bolster, Broken Through Weld. Breaking Load, 159,300 Lb.

or burned out beveled or V shape in order that a good surface will be obtained for the uniting of the metal, care and patience as well as skill being employed to prevent oxidiza-



Method of Testing the Truck Frames

experience in general railroad welding with the method involved.

Second.—Only in an emergency should an attempt be made to weld a side frame or bolster until it has been removed from the car, and whenever it is necessary to do so the recommendation. To insure this, the work should be placed at an angle that would allow the flowing out or blowing out of all slag or impurities in the fused metal; the operators giving the torch a rotary movement, will assist in their removal and make a stronger weld than if this practice was not observed.

It is also considered good practice to increase the welded section 15 or 20 per cent a short distance on each side of the weld and gradually taper down to the original thickness of section.

Fifth.—Experienced authorities in electric welding claim that the expense of removing the part to be welded from a car may be obviated by welding right in position on the car, the only handicap being the ability of the operator to clean out the check or crack in the proper manner before starting to make the weld.

In repairing a broken part where the material is not too heavy or over one inch in thickness it can readily be done by chipping out equally on each side of the crack, making the cut about 30 degrees. This can ordinarily be done with an air hammer and chisel, or by hand if it is impossible to get the air hammer to the job. Be sure to chip out the entire crack, even if it extends only part way across the section; chip far enough back so there will be no portion of the crack in the metal. Failure to do this permits the check or crack to continue to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. If it is impossible to chip or cut out the check or cracked section so as to eliminate it, good practice would be to drill a hole at the end of the crack, which would have a tendency to prevent the check from working across.

After chipping the metal away the V should extend nearly through the plate or section; the operator should start to weld at the break farthest away from the outside edge and work the weld back toward the edge. This process has proven more successful than where the weld was commenced at the outside and welded toward the center. Inasmuch as the heat introduced has a tendency to expand the parts being welded, when cooling takes place it produces a strain on the inner portion of the weld.

It is very difficult to present detail instructions on this class of work, as practically every job is a problem of itself, the grade of material to be used depending on the quality of the stock to be welded. The diameter of the electrode, thickness of material, the place where the work is to be done, and the strength necessary to have in the weld when completed, are or should be all based on the knowledge of the operator working on the welding of the part. Hence the necessity of having an operator with an extended experience on work of this character.

Sixth.—The committee recommends that when welding is done the weld should be made smooth, 3/8-in. steel dies, let-

BOOK A

Test No.	Type	Defect welded	Character of failure	Breaking Load	Weight of Casting	Remarks
			SIDE FRAMES			
1	Andrews	Crack in tension member	Broke through weld	200,000 lb.	417 lb.	Poor weld fracture porous
2	Vulcan	Two cracks in tension member	Broke through spring plank seat	310,000 lb.	604 lb.	
3	Andrews	Crack 3¾ in. long	Broke through crack	259,000 lb.	411 lb.	Tested without welding. See Fig.
4	Andrews	Crack in tension member	Broke through spring plank seat	283,000 lb.	434 lb.	1 and 2
5	Andrews	Crack in tension member	Broke through weld	290,590 lb.	419 lb.	
6	Andrews	Crack in tension member	Broke through weld	221,000 lb.	348 lb.	Welded with the electric arc
7	Andrews	Crack in tension member	Broke through weld	223,100 lb.	354 lb.	Poor weld
8	Andrews	Crack in tensiion member 1½ in. long	Broke through crack	332,000 lb.	409 lb.	Tested without welding
9	Bettendorf	Crack in tension member	Broke through weld	149,600 lb.	491 lb.	Poor weld. (See Fig. 3)
10	Bettendorf	Cracks in tension and compression members	Broke through weld in tension members	189,200 lb.	440 lb.	Poor weld
18	Bettendorf	Crack in tension member	Broke through weld	273,700 lb.	488 lb.	Welded with the electric arc
20	Bettendorf	.....	Frame distorted and cracked	592,400 lb.	580 lb.	Taken from stock, no defect
21	Andrews	.....	Broke through spring plank seat	269,300 lb.	390 lb.	Taken from service, no defect
			TRUCK BOLSTERS			
14	Channel section.	Cracks in flanges	Broke through weld	171,600 lb.	568 lb.	
15	I-section	Cracks in compression members	Broke in tension member under side bearing	187,000 lb.	534 lb.	
16	Channel section.	Crack in tension member	Broke through the weld	159,300 lb.	537 lb.	See Fig. 4
17	I-section	Crack in compression member	Bolster distorted and cracked in tension members	264,700 lb.	616 lb.	
19	.....	.....	.....	281,500 lb.	513 lb.	Taken from service, no defects
			BODY BOLSTERS			
11	I-section	Crack in tension member	Broke through the weld	220,000 lb.	636 lb.	
12	I-section	Crack in tension member	Broke in tension member outside the weld	228,700 lb.	602 lb.	
13	I-section	Crack in tension member and web	Broke through weld	181,300 lb.	661 lb.	

BOOK B

			TRUCK SIDE FRAMES			
1	Bettendorf	Crack in compression member	Truck side frames broke through spring plank seat	249,380 lb.	.....	
2	Bettendorf	Crack in tension member	Broke through spring plank seat	249,380 lb.	481 lb.	
3	Bettendorf	Crack in tension member	Frame distorted	310,450 lb.	421 lb.	
4	Bettendorf	Crack in tension member	Broke through journal box	223,900 lb.	424 lb.	See Fig. 5
5	Andrews	Crack in tension member	Broke in unwelded tension member	279,900 lb.	415 lb.	
6	Andrews	Crack in compression member	Broke near journal box seat	223,900 lb.	374 lb.	
17	Andrews	Crack in tension member	Broke through weld	264,600 lb.	407 lb.	Welded with iron of low tensile
19	Bettendorf	Crack in tension member	Broke through spring plank seat	213,750 lb.	444 lb.	strength
21	Bettendorf	Crack in tension member	Frame distorted	290,000 lb.	430 lb.	
			TRUCK BOLSTERS			
7	I-section	Crack in compression member	Broke through tension member	249,380 lb.	600 lb.	
8	I-section	Crack in tension member	Broke through tension member outside weld	310,450 lb.	660 lb.	
9	I-section	Crack in top member	Broke in top member outside the weld	127,335 lb.	605 lb.	
13	I-section	Welded in compression member	Broke in tension member	320,600 lb.	643 lb.	Tested transversely
14	I-section	Cracked in compression member	Broke in tension member	391,880 lb.	600 lb.	
18	I-section	Crack in compression member	Broke in tension member	244,290 lb.	586 lb.	
22	Channel section.	Crack in tension member	Broke in flange outside weld	310,450 lb.	629 lb.	
23	Channel section.	Crack in tension member	Frame distorted	442,700 lb.	682 lb.	
			BODY BOLSTERS			
10	I-section	Crack in tension member	Broke in tension member outside weld	208,650 lb.	529 lb.	
11	I-section	Crack in tension member	Broke in the weld	187,500 lb.	.....	Poor weld
12	I-section	Crack in tension member	Broke in tension member outside the weld	188,300 lb.	521 lb.	
15	I-section	Crack in tension member	Broke in upper member outside the weld	142,500 lb.	505 lb.	Tested transversely
16	I-section	Crack in tension member	Broke in tension member outside weld	254,500 lb.	506 lb.	See Fig. 6
20	I-section	Crack in tension member	Broke in tension member	147,590 lb.	470 lb.	Metal porous weld poor

ters and numerals, used legibly to stamp the initials of the road, place, date and identification number of the welder; this not only as an incentive for the operator to do his best work, but also to result in a more careful supervision and inspection, as well as a convenient means of locating the responsibility for inferior workmanship.

Proposed marking:	Date	Road
	0-00-00	XYZRR
	Shop Mark	Welder

The thanks of the association are due the American Steel Foundries and the Bettendorf Company, who placed their testing facilities at the entire disposal of the committee.

The report was signed by W. O. Thompson, chairman,

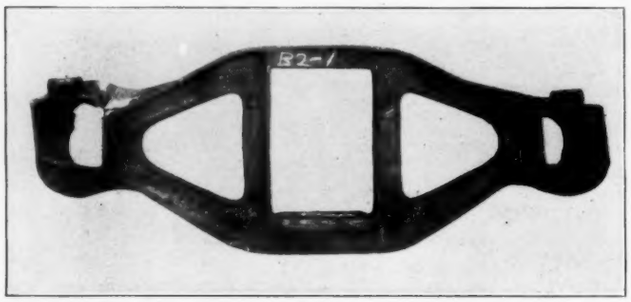


Fig. 5—Book B, Test 4. Side Frame Welded in Tension Member. Failed at Journal Box. Breaking Load, 223,900 Lb.

N. Y. C.; G. W. Rink, C. R. R. of N. J.; J. J. Hennessey, C., M. & St. P.; A. M. McGill, L. V.; R. W. Schulze, St. L. & S. F.; Willard Kells, A. C. L.; J. R. Gould, C. & O.; E. H. Sweeley, Long Island, and C. F. Giles, L. & N.

Results of Tests

Folios *A* and *B*, which were introduced as exhibits by the committee, contained data concerning the tests conducted at the American Steel Foundries and the Bettendorf plant, respectively. The general results of these tests are given in the table. The deflection and permanent set were recorded for a side frame of each type, a truck bolster and a body bolster.

Fig. 6—Book B, Test 16. Body Bolster Welded in Tension Member, Broken in Tension Member Outside the Weld

The committee presented the following summary and conclusion in connection with the tests reported in Book *B*.

Summary

Of the 23 tests as per data herewith there were 10 castings in which the original fracture had consisted of a complete break of the entire tension member, the fracture extending well into the web, with the exception of test No. 19, the tension member of which was broken in from both sides, but not quite wholly fractured. (See photograph 1391.)

Of these 10 castings the tension member of which was entirely fractured, only three broke in the weld under test. (See test No. 11, casting F-8; testing No. 17, casting F-1; and test No. 20, casting F-3.)

If, in view of the data herewith submitted, it is desired to weld tension members that are almost wholly broken, with the fracture showing porosity, the welded portion should be built up to a considerable extent for 2 in. or 3 in. over the surface to compensate for what may have been a weak point.

Conclusion

As a conclusion it may be said that the tests clearly indicate that properly made welds are satisfactory.

In view of these tests and experiments it is considered important that in making such welds consideration should be given to the tensile strength of the welding material as compared with the tensile strength of the casting welded. If Norway iron or other welding metals of low tensile strength are used, the welds should be built up an amount sufficient to compensate for the total tensile strength of the section to be welded.

Discussion

Chairman Thompson: The committee, with the one exception, is fully in accord with the practice endorsed in the report. It has endeavored to recommend a method for successfully welding truck sides and bolsters.

F. M. Waring (Pennsylvania): The committee states that the proper welding of side frames and bolsters should not be prohibited. It also presents a conclusion that it is difficult to give instructions for this class of work and that the quality of the welding may vary to a large extent. I think that is true. Very often a good weld will even show a higher tensile strength than the original material, but when that part is put into service and subjected to tension or to vibration quite frequently we find that detailed fractures develop at the junction of the welding metal and the original metal. They progress across the section until it is too weak to carry the load. Such a weld will show up excellently on a tensile test.

C. E. Chambers (C. R. R. of N. J.): I don't think we should prohibit the electric welding of cast steel frames. The Central of New Jersey equipped 1,000 cars with about the first cast steel side frames that were made. Probably 75 per cent of those frames have been welded at some point. Very few of them have failed after being welded. After we started reinforcing the weld I don't know of any failures.

J. J. Hennessey (C. M. & St. P.): Of the thousands of truck sides that have been welded we have only had failures in wrecks, and those we welded again. Where a truck side has been broken clear through we don't weld them.

I. S. Downing (Big Four): We started welding truck sides at a great many points and had many failures. Then we put an expert in charge, and now I am convinced that if it is done under the proper supervision you can weld a truck side just as well as anything else.

J. H. Milton (Rock Island): We are welding six or seven hundred couplers a month and knuckles, truck sides, body bolsters and truck bolsters and are having very good success.

I. S. Downing: This association should go on record as approving recovering material in any way possible.

C. E. Fuller (Union Pacific): We have welded new eyes in couplers. If properly done it is absolutely safe, but you must have an experienced operator.

Action Taken

F. M. Graff (Erie): *I move that this Association recognize as good practice and sanction the extension of autogenous welding to all parts of car equipment.*

C. T. Ripley (Santa Fe.): I think that would work wrong in the case of car wheels. The wheel committee should be considered in connection with that. Before it is recommended there should be more experimenting done. A series of experiments has been made to demonstrate the value of welding and annealing and the results are remarkable. Under tests welded sides would break very much more easily before annealing than afterward.

(*Mr. Graff's motion was carried.*)

The recommendations of the committee were accepted.

Report of Committee on Loading Rules

A. Kearney
Chairman

THE COMMITTEE submitted the following recommendations covering additions and changes in the present Code of Loading Rules. The committee has received a number of recommendations and suggestions from the Regional Directors and others, relative to new rules to cover lading not taken care of in the present Code of Loading Rules and changes in the present rules. The suggestions in the main have reference to the conservation of the car supply by increasing the load carried per car and by prohibiting the use of hopper bottom cars for shipments of pig iron, billets and similar material, so that this type of cars may be available for ore and coal shipments.

On account of the apparent necessity that immediate action be taken, this committee has prepared several new rules and revised others, sending them to the executive committee for their approval, they being later issued as a supplement to the present Code of Loading Rules.

The rules which have been revised and issued as a supplement to the present Code of Loading Rules by the Executive Committee, are as follows: Supplement Circular No. 16, issued November 20, 1917, revising rules 31, 53, 98-A and 98-B, 103-A and 124-B; Supplement Circular No. 35, issued March 4, 1918, revising rules 57, 58, 117-D and 121-B, and Supplement Circular No. 42, revising rule 53.

Proposed Changes in the Loading Rules

In addition to the foregoing, the committee recommends the following changes in the present M. C. B. Loading Rules:

Rule 7.—Change the second sentence, reading "If lading is placed on top of sides of gondola cars, etc.," to read "If lading is placed on *bearing pieces located on top of sides of gondola cars, etc.*"

Explanation. To clarify the intent of the rule.

Rule 9.—In the first line after the word "project" change the word "over" to "*beyond.*"

Explanation: To permit of loading longer material as a single load without the use of an idler.

Rule 10.—In the second line after the word "project" change the word "over" to "*beyond,*" also add to the last sentence the following: "*except flat cars of* 60,000 *lb. capacity equipped with an inverted truss may be used as an idler.*"

Explanation: Relative to changes in rule, see explanation under Rule 9. The addition to the rule will permit 60,000 lb. capacity wooden flat cars having inverted trusses to be used as idlers.

Rule 12.—In the second sentence of note, change the 36 in. dimension to 46 in.

Rule 21.—In the first line after the word "project" change the word "over" to "*beyond.*"

Explanation: See explanation Rule 9.

Rule 23.—Change the first sentence after the word "car" to read "*except as provided for in Rules* 80 *and* 82."

Explanation: To make the requirements more definite as to when it is permissible to use bearing pieces or to use sliding pieces between the bolster and the end of the car.

Page 25.—Change general heading reading as follows: "Rules governing the loading of lumber on open cars," to read "Rules governing the loading of lumber *or timber* on open cars."

Page 25.—Change heading relative to loads on single cars reading as follows: "Lumber loaded on single cars as in Figs. 5 and 6," to read "Lumber *or timber* loaded on single cars as in Figs. 5 and 6."

Rules 32 *and* 33.—In the first line after the word "lumber" insert the words "*or timber.*"

Rule 34, *Section B.*—In the first line after the word "lumber" insert the words "*or timber.*"

Explanation: To clarify the intent of the rules.

Rule 34, *Section C.*—Change the first paragraph reading as follows: "For loads of lumber not lapped or stripped, the size of hardwood stakes must not be less than:" to read "For loads of lumber *or timber not of equal thickness, which can not be lapped or stripped,* the size of hardwood stakes must not be less than:"

Explanation: To clarify the rule as to lumber or timber that may be loaded without being lapped or stripped.

Page 33.—Change heading reading as follows: "Long lumber loaded on top of single loads as in Fig. 7," to read "Long lumber *or timber* loaded on top of single loads as in Fig. 7."

Page 35.—Change heading reading as follows: "Lumber loaded as per Figs. 8 and 9," to read "Lumber *or timber* loaded as per Figs. 8 and 9."

Explanation: To make the heading conform to the changes in rules referring to lumber shipments.

Rules 36 *and* 48.—Change last sentence to read as follows:

"Stakes must not be less than two feet nor more than four feet apart *from center to center of stakes.*"

Explanation: To clarify the rules as to the permissible distance between stakes from center to center. This change has no bearing on the spacing of the stake pockets as referred to in Interchange Rule 3, paragraph (N).

Rule 41.—In the second line after the words "bearing pieces," insert "*having a bearing surface bottom and top its entire length.*"

Explanation: To clarify the intent of the rule.

Page 38.—Change heading reading as follows: "Lumber loaded as per Figs. 10, 11, 12 and 13," to read "Lumber *or timber* loaded as per Figs. 10, 11, 12 and 13."

Explanation: To clarify the intent of the rule.

Rule 49.—In the second line after the word "Section" insert "*having at least* 10 *in. bearing surface bottom and top extending the entire length of bearing piece.*"

Explanation: To clarify the intent of the rule.

Page 38.—Change the second heading reading as follows: "Lumber on gondola cars as per Figs. 14 and 15," to read "*Lumber or timber* on gondola cars as per Figs. 14 and 15,"

Explanation: To clarify the intent of the rule.

The heading on all cuts referring to lumber loading should be changed to read "Lumber *or timber.*"

Rule 51.—In the first line after the word "Material" insert "*except Logs, Telegraph and Telephone Poles, Piling and Props.*"

Explanation: This is an undesirable manner of loading logs and poles.

Figs. 14, 14-A, 15 and 15-A omit reference to "*Logs, Telegraph and Telephone Poles, Piling and Props.*"

For explanation, see Rule No. 51.

Rule 52.—In the second line after the word "inches" insert "*in section having at least* 10 *in. bearing surface bottom*

and top extending the entire length of bearing piece and".

Explanation: To clarify the intent of the rule.

Rule 81-*A*.—Second line: Change the words "with two bearing pieces and two or four sliding pieces" to read *"with two bearing pieces with or without sliding pieces."*

Explanation: To clarify the intent of the rule.

Rule 113.—At the end of the third sentence add a sentence reading: "If the pipe do not completely fill the space between stakes, angular shocks not less than 4 in. x 5 in. in section should be placed against the outside pipe and securely nailed to the bearing piece."

Rule 114.—A sentence should be added to the rule reading as follows:

"If the pipe do not completely fill the space between the stakes, angular chocks not less than 4 in. x 5 in. in section should be placed against the outside pipe and securely nailed to the bearing piece."

Explanation: To make the rules conform to the changes made in Figs. 78 and 79.

Figs. 78 and 79.—Change bearing pieces from 4 in. x 5 in. to 2 in. x 4 in. to make the cuts conform to Rules 113 and 114, also show on cuts the *maximum distance between the ends of the two top courses of pipe in the center.*

Loading of Large Mill Block, Large Bridge Stone, Shoddy, Breakwater or Other Large Stone, Having Regular or Irregular Surfaces.

Rule 120.—"Mill block having a regular surface to rest on car floor, no dimension of such bearing surface being less than the height of stone, should be protected on the sides and ends by cleats not less than 2 in. x 4 in. in section, of sound straight-grained lumber, extending at least three-fourths of length or width of stone. When the stone is loaded close together or wedged apart, cleats are required on sides and ends only of outside stone. When such stone is loaded in tiers, standard end and side protection must be provided.

"Mill block containing as much as 100 cu. ft., resting on channel or scabbled surface not less than 25 sq. ft., or proportional for increased sizes, must be so loaded that the weight of total lading will be uniformly distributed over the floor of the car, resting on a layer of sand, cinders or crushed stone, covering the entire bearing surface of the stone.

"Gondola cars are preferable for such shipments, but if flat cars are used, the lading must be placed at least 18 in. back of end of car. Each block of stone loaded lengthwise, crosswise or obliquely must be protected against creeping by side and end cleats, securely nailed to floor of car with 40-penny nails. (When two blocks of stone are loaded parallel and close to each other, or wedged apart, they will be considered as one stone as to cleating.)

"If stone is placed lengthwise of car and is 4 in. or closer to side of car, two standard side stakes 6 in. in height must be placed opposite such stone in lieu of cleats, on that side of stone. Stone must not be loaded obliquely when it is possible to load it lengthwise or crosswise of car.

"Cleats must consist of not less than 2 in. x 4 in. sound straight-grained lumber, and extend at least three-quarters of length or width of stone.

"If the 2-in. cleat does not have a full 1-in. vertical bearing for its full length against edge of stone, cleats may be built up to the requisite height, retaining the specified width."

Rule 120-A.—"Large stone containing as much as 30 cu. ft. and having a regular surface of at least 8 sq. ft. to rest on car floor, but no dimension of such bearing surface being less than 1 ft. 6 in., should be protected at the end with standard end stakes extending at least one-half the height of the stone. In no case must the height of the stone be more than one and one-half times the smallest dimension resting on the car floor. The distance from the end of the stone to the inside edge of the stakes must be not less than 6 in. measured across the car; otherwise standard board should be securely nailed to the inside of the stakes. When single large blocks as much as 6 ft. in length are loaded crosswise of the car, the end protection should be two standard stakes extending at least one-half the height of the stone.

"Any large stone having regular surface, not covered by the preceding paragraph, must, in addition to the specified end protection, be secured at the sides by the standard stakes opposite the stone. The distance from the end of stone to the inside of stakes must be not less than 12 in. measured lengthwise of car. If on account of the location of the stake pockets or for any other reason this distance can not be obtained, standard boards should be provided opposite the tier of stone to prevent any possibility of the stone becoming insecure. Boards should be securely nailed to the inside of the stakes."

Rule 120-*B*.—"Large stone with irregular surfaces, loaded on flat cars, must be securely wedged, stripped or blocked to prevent the stone from rocking. Standard end protection must be provided as specified in Rule 120-A, also two stakes must be placed opposite each outside piece of stone. The end of the stone must not be less than 12 in. from the inside edge of the stakes measured lengthwise of car. If on account of the location of stake pockets or for any other reason this distance can not be obtained, standard boards should be provided opposite the blocks of stone to prevent any possibility of the stone becoming insecure. When such stone is loaded in gondola cars it should be securely wedged, stripped or blocked if there is any possibility of the stone rocking. Large block bridge, shoddy, breakwater or other large stone should not be loaded in gondola cars unless there are derrick facilities for unloading."

Explanations: A paragraph has been added to cover small mill blocks containing less than 100 cu. ft., also the paragraphs have been rearranged in order to clarify the rules.

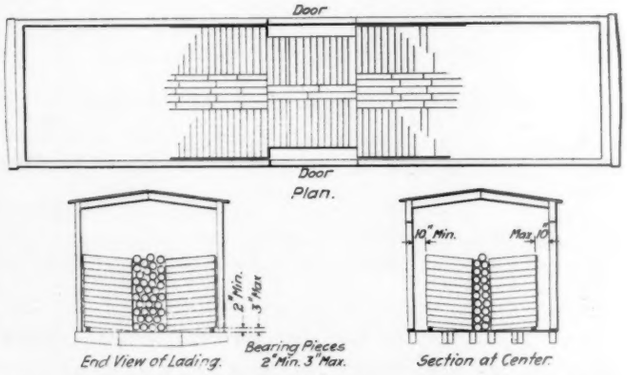


Fig. 104-A, Rule 126—Manner of Loading Wood Cores 3 ft. to 4½ ft. Long in Box or Stock Cars

Rule 126.—Add a paragraph reading as follows:

"Wood cores and similar round wood 3 to 4½ ft. in length should be loaded as per Fig. 104-A. This method makes the stripping of door opening unnecessary."

The report was signed by A. Kearney, chairman, assistant superintendent motive power, Norfolk & Western; A. B. Corinth, general car inpsector, Atlantic Coast Line; L. H. Turner, superintendent motive power, Pittsburgh & Lake Erie; R. L. Kleine, chief car inspector, Pennsylvania; E. J. Robertson, superintendent car department, Minneapolis St. Paul & Sault Ste. Marie; C. N. Swanson, superintendent car shops, Atchison, Topeka & Santa Fe; H. C. May, superintendent motive power, Chicago, Indianapolis & Louisville, and H. H. Harvey, general car foreman, Chicago, Burlington & Quincy.

Discussion

A. Kearney (N. & W.), chairman: The other items still pending are as follows: Loading pipe on flat cars, and loading sheet or iron plates in box cars. We will soon be able to submit a report on this. The committee has been working on the loading of concrete culvert pipe on flat cars and will have something governing that soon. Then we have rules 56 and 57 relating to changing the height of lading requiring the wiring from four feet to five feet. The last relates to requiring bulkheads in connection with the shipment of dressed lumber on flat or open cars. The loading of dressed lumber on open cars has given us a good deal of concern. During the last year an embargo was put out by one of the lines entering Chicago which was objected to by some of the lumber shippers. A great deal of correspondence ensued and finally the embargo was lifted. After meeting the lumber people a special committee was formed of railroad men and lumber shippers, but principally shippers from the south. An arrangement designed at Altoona, by Mr. Kleine was put into the hands of the lumber shippers with the idea of building up a number of loads and shipping them to destination to see how they ran and how the loads held. As yet we have no report from the loaders. It might also be interesting to add that the lumber shippers appealed to the Interstate Commerce Commission and we, in turn, received some correspondence through Mr. DeGroot who now has that matter in hand. He told me a few days ago that the embargo had been lifted on the line running out of Chicago and they thought it would remain so until they got the final report from the lumber committee and the sub-committee and finally our committee on loading rules.

If in order I would suggest that the balance of the report be put in shape as quickly as possible, and submitted to a special ballot, unless you would care to adopt it on the floor. Our idea is that if it could be sent out in advance of the regular October issue of the report the shippers would receive a good deal of benefit in the meantime.

F. W. Brazier (N. Y. C.): I want to call the attention of the committee to a severe accident we had lately in loading structural timber 60 ft. long piled upon two cars. In crossing from one track to another such a strain was brought on the stakes that they broke off and the timbers fell over on the passing track. Fortunately only a derailment occurred. These timbers were loaded according to the M. C. B. rules.

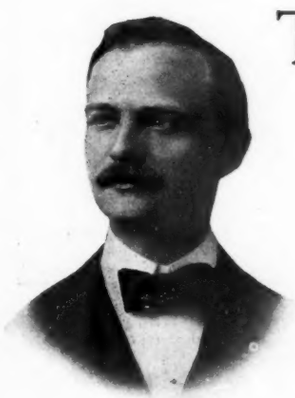
Action Taken

Mr. Brazier: I move that the report be adopted as read.

J. J. Hennessey (C. M. & S. P.): I would like to amend that motion to the effect that the report be received and adopted as read and that the report of the committee and sub-committee be referred to the Executive Committee, without waiting for letter ballot.

The motion was carried as amended.

Couplers, Report of Standing Committee



R. L. Kleine
Chairman

THE M. C. B. STANDARD *D* coupler was adopted by special letter ballot in 1916 and is now shown in the 1917 Proceedings, Sheet 23-B. The following details were left for further consideration and investigation: Contour line; design of 6-in. by 8-in. shank and key slot; gages to insure interchangeability of coupler parts; and, specifications for purchase and acceptance. This report covers briefly the investigations of the above features, with definite recommendations for adoption.

Two contour lines, the No. 5 and the No. 10, as shown in previous reports of the committee, were thoroughly tried out in connection with both road service and laboratory tests of the experimental couplers, including the Type *D*. Practically equal numbers of each contour were used. The various phases of the investigations covering this subject are given in brief as follows:

Angling and Coupling.—This question has been discussed in previous reports of the committee. The results of tests conducted demonstrated that either the No. 5 or No. 10 line permits at least as much horizontal angling as the M. C. B. 1904 line, with a slight advantage in favor of No. 5; and both the No. 5 and No. 10 lines provide for more vertical angling than the present M. C. B. 1904 line, the No. 10 line providing the larger amount.

The No. 10 lines when coupling with themselves require a slight amount of momentum to effect the final closure of the knuckle on curves. This is also true when coupling to the M. C. B. (1904) contour but only when the knuckle of the latter is open. This momentum is imparted to the knuckle when coupling even at low speeds.

Observations of actual couplings were made but in no instance has any difficulty been reported in coupling with the No. 10 lines.

Conclusions on Angling and Coupling.—In view of the various tests and road experience, either the No. 5 or No. 10 contour is acceptable.

Slack in Contour.—While slack in couplings has generally been considered undesirable, a certain amount of slack in any contour line is essential to provide for freedom in coupling as well as angling. It is not the initial slack in the contour line but the ultimate slack developed by wear and distortion of parts with which we are concerned.

The slack as follows for the three contour lines under discussion when the couplers are new, having mean contour lines:

14-32 in., M. C. B. 1904 contour line.
21-32 in., No. 5 contour line.
1 in., No. 10 contour line.

To obtain data on actual conditions in service, three separate investigations were conducted by the committee as follows:

First Investigation.—This covered M. C. B. (1904) contour couplers and was given in the 1913 report, from which we quote the following:

Couplers with M. C. B. 1904 contour	Average slack per coupling	Maximum slack
One train of 61 old cars	1.66 in.	2.875 in.
Another train of 68 old cars	1.39 in.	2.250 in.
One train of 41 comparatively new cars	.96 in.	.....
One train of 26 new cars	.64 in.	.....

From the above it is clearly evident that the M. C. B. 1904 contour lines develop a large amount of slack under service conditions.

Second Investigation.—This covered a train of 50 N. & W. 90-ton capacity cars equipped with *A* and *B* couplers of No. 5 and No. 10 contour which had been in service about

nine months. This investigation was included in the committee's report for 1914. The detail figures of this report show that ten couplings of the No. 5 contour averaged 1.112 in. slack per coupling and 14 couplings of the No. 10 contour averaged 1.268 in. per coupling. Assuming that these couplers were of the mean contour when applied, the results would indicate that both lines are developing slack, the development in the No. 5 lines being at the greater rate.

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches Minimum	Average	Maximum
4.	A-5 with A-10	1.44	1.477	1.57
4.	B-5 with B-10	1.24	1.277	1.33
2.	A-10 with B-10	1.43	1.495	1.56
2.	A-5 with B-10	1.52	1.555	1.59
4.	B-5 with A-10	1.10	1.447	1.65
	SUMMARY			
8.	No. 5 with No. 5	....	1.455	....
9.	No. 10 with No. 10	....	1.439	....
14.	No. 5 with No. 10	....	1.423	....

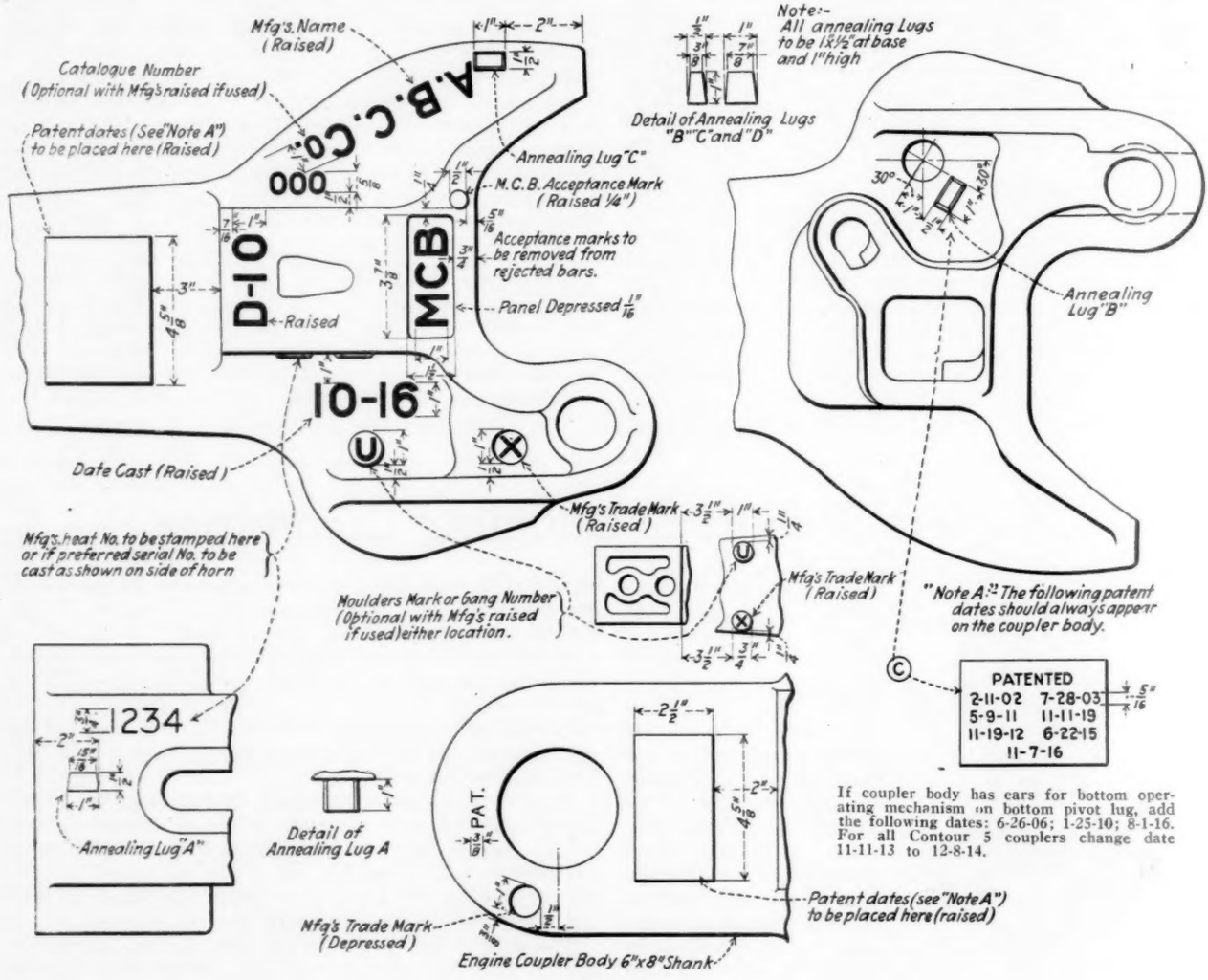

Mfg's Name (Raised)
Catalogue Number (Optional with Mfg's raised if used)
Patent dates (See "Note A") to be placed here (Raised)
A.B.C.C.Co.
000
Annealing Lug "C"
M.C.B. Acceptance Mark (Raised ¼")
Acceptance marks to be removed from rejected bars.
Panel Depressed 1/16
D-10
Raised
MCB
10-16
Date Cast (Raised)
Mfg's heat No. to be stamped here or if preferred serial No. to be cast as shown on side of horn
Moulders Mark or Gang Number (Optional with Mfg's raised if used) either location.
Mfg's Trade Mark (Raised)
Mfg's Trade Mark (Raised)
234
Annealing Lug "A"
Detail of Annealing Lug A
PAT.
Mfg's Trade Mark (Depressed)
Engine Coupler Body 6"x8" Shank
Note:- All annealing Lugs to be 1x½" at base and 1" high
Detail of Annealing Lugs "B" "C" and "D"
Annealing Lug "B"
"Note A:" The following patent dates should always appear on the coupler body.
PATENTED
2-11-02 7-28-03
5-9-11 11-11-19
11-19-12 6-22-15
11-7-16
Patent dates (see "Note A") to be placed here (raised)

Fig. 1

If coupler body has ears for bottom operating mechanism on bottom pivot lug, add the following dates: 6-26-06; 1-25-10; 8-1-16. For all Contour 5 couplers change date 11-11-13 to 12-8-14.

Third Investigation.—This covered a number of complete trains of 90-ton cars on the Norfolk & Western. The investigation was conducted in April, 1917, at which time the N. & W. had 750 cars of 90-ton capacity three years old, half of which were equipped with *A* couplers and half with *B* couplers, (these cars were of the same series as those referred to in the second investigation), also 1,000 cars of 90-ton capacity nine months old, half of which were equipped with *C* and half with *D* couplers. The different types of couplers were divided about evenly between the No. 5 and No. 10 contours. Table I. gives the average results of this investigation:

TABLE I—TYPES *A* AND *B* COUPLERS AFTER THREE YEARS' SERVICE

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches Minimum	Average	Maximum
5.	A-5 with A-5	1.44	1.598	1.72
0.	B-5 with B-5	0	0	0
3.	A-10 with A-10	1.41	1.616	1.86
4.	B-10 with B-10	1.20	1.277	1.39
3.	A-5 with B-5	1.08	1.217	1.30

TYPES *C* AND *D* COUPLERS AFTER NINE MONTHS' SERVICE

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches Minimum	Average	Maximum
4.	C-5 with C-5	.94	1.112	1.27
2.	D-5 with D-5	.74	.825	.91
5.	C-10 with C-10	1.29	1.356	1.45
5.	D-10 with D-10	1.00	1.122	1.28
3.	C-5 with D-5	.94	.977	1.00
8.	C-5 with C-10	.91	1.061	1.20
9.	D-5 with D-10	.64	.871	1.13
9.	C-10 with D-10	1.12	1.221	1.31
12.	C-5 with D-10	.81	1.027	1.41
11.	D-5 with C-10	.90	1.038	1.18
	SUMMARY			
9.	No. 5 with No. 5	....	1.003	....
19.	No. 10 with No. 10	....	1.231	....
40.	No. 5 with No. 10	....	1.002	....

Conclusions on Slack.—These figures verify the deductions made in the second investigation, that while the slack initially in the No. 5 contour is less than that in the No. 10 contour it increases more rapidly in service in the former. It also shows that the slack is about equal in both lines after three years' service and that this slack is less than in couplers with the M. C. B. 1904 line.

Advantages of No. 10 Line.—The No. 10 line on account of having the coupler face and front face of the knuckle parallel to each other and perpendicular to the longitudinal center line of the coupler shank provides ideal conditions for pushing service in that it keeps the longitudinal center line of mating couplers in alinement. This was clearly demonstrated in tests conducted on a 2 per cent grade and 9 deg. curves on the Pennsylvania with locomotives and cabin cars equipped with No. 10 contour line couplers.

By eliminating the inclined face on the head of the coupler the nose of the knuckle is relieved of strains in coupling and buffing; furthermore, the wedging action due to the knuckle

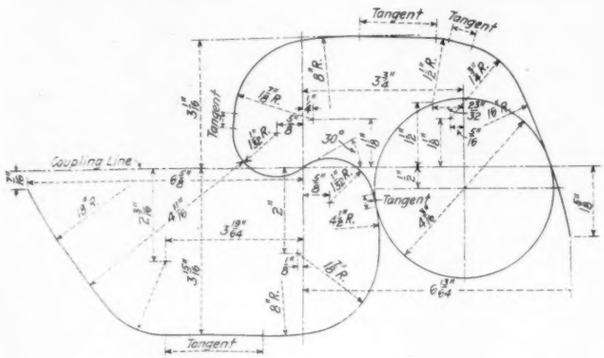


Exhibit "A"-No. 10 Contour

engaging both the face of the coupler and the guard arm is also eliminated.

Conclusions on Contour Line.—At a joint meeting of the coupler manufacturers and M. C. B. Coupler Committee, held at Altoona, March 29, 1918, the coupler manufacturers were unanimous that but one contour line should be adopted and that the same should be decided by the Coupler Committee. The committee thereupon unanimously agreed to recommend for adoption the No. 10 contour line, as shown on Exhibit *A*.

Note.—At this meeting R. E. Janney, of the American Steel Foundries, presented his views on the contour lines with the request that it be embodied in the minutes of the meeting. Accordingly it is included as Exhibit *B*.

Design of Six-inch by Eight-inch Shank and Key Slot

Exhibit *C* shows the design of the 6-in. by 8-in. shank as agreed upon between the coupler manufacturers and the M. C. B. Coupler Committee at the meeting held at Altoona, March 29, 1918. This design was also approved by the Committee on Car Construction and conforms with the design adopted by the United States Government for freight cars. This shank takes a 1½-in. by 6-in. key.

Gages to Insure Interchangeability of Coupler Parts

Since the M. C. B. Standard *D* coupler and parts will be made by different coupler manufacturers, interchangeability is a very essential and important feature. The committee in conjunction with the manufacturers has very thoroughly gone into the matter and recommends for adoption as standard, gages which will control the coupler and all its parts. To maintain the correctness of these gages, master gages have been designed and are now being placed in the hands of the coupler manufacturers.

NOTE: The drawings of the gages listed above are on file with the association.

The committee has tried out these gages on the product of two of the coupler manufacturers and finds that the gages control the interchangeability of the parts as intended.

Specifications for Purchase and Acceptance of Couplers

Uniform specifications for the M. C. B. Standard *D* coupler have been developed jointly with the coupler manufacturers, the M. C. B. Committee on Specifications and Tests of Materials and the Coupler Committee and are appended as Exhibit *D*. These specifications have been tried out and are found to be satisfactory.

The principal departure from the present M. C. B. Standard coupler specifications is in the omission of the physical tests for the complete couplers and separate knuckles, as such tests are unnecessary since we have but one design and this design has been fully tested out before adoption as standard. The recommended specifications provide for physical and chemical tests of the steel, checking of the annealing as well as limiting weights of the coupler and parts, which, together with the gages, will fully control the product.

These specifications involve the testing of the various heats of steel at the time of manufacture and are acceptable to the coupler manufacturers if carried out by a central inspection bureau controlled by the M. C. B. Association or some other central body.

Recommendations

In accordance with the above report the committee recommends that the following be submitted to letter ballot for adoption as Standard of the Association in connection with the Standard *D* coupler:

I. No. 10 Contour Lines as shown on Exhibit *A*.

II. Design of 6-in. by 8-in. Shank and Key Slot for same as shown on Exhibit *C*.

III. Gages to insure interchangeability of coupler parts.

IV. Specifications for Purchase and Acceptance as per Exhibit *D*.

The report was signed by R. L. Kleine, chairman, Pennsylvania; G. W. Wildin, F. W. Brazier, New York Central; F. H. Stark, Montour; J. W. Small, Seaboard Air Line; J. A. Pilcher, Norfolk & Western, and W. Alexander, Chicago, Milwaukee & St. Paul.

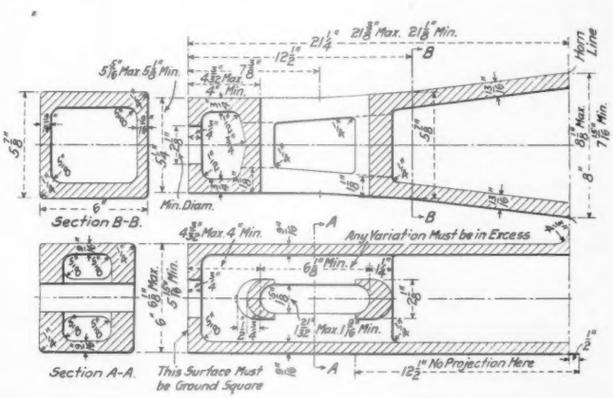


Exhibit "C"—Design of 6 in. by 8 in. Shank for Standard "D" Coupler

Exhibit "B"

R. E. Janney submitted a statement in favor of the No. 5 contour. Mr. Janney claimed (1) that there is as much room for vertical angling in the No. 5 contour as in the No. 10; (2) that back lash in couplers with the No. 10 contour will cause the blow in buffing to fall on the face of the contour just beyond the guard arm and on the lugs on the coupler while with the No. 5 contour the contact is distributed over the whole face of the contour from the base of the guard arm to the throat of the knuckle, and (3) that the inclined face of the coupler has no influence on face breakage.

Mr. Janney also stated that when coupling with the No. 10 contour the car will start to move away before the momentum of the knuckle can close it far enough for the lock to drop.

Exhibit "D."—Specifications for M. C. B. Standard "D" Couplers, Knuckles, Locks and Other Parts

1. *Scope.*—These specifications cover all cast steel for complete couplers and for repair parts.

I. Manufacture.

2. *Process.*—The steel shall be made by the open-hearth or electric-furnace process and in accordance with the best foundry methods.

3. *Heat Treatment.*—(a) Unless otherwise specified, all castings shall be allowed to become cold before the process of heat treatment (annealing). They shall then be uniformly heated to the proper temperature to refine the grain and cooled uniformly in the atmosphere.

(b) If the results of physical tests of any melt do not conform to the requirements specified, a manufacturer may re-treat such melt, but not more than two additional times. Tests after re-annealing shall be made as specified in Sections 7 and 8.

4. *Annealing Test Lugs and Physical Test Coupons.*—(a) For the purpose of determining the quality of annealing, annealing lugs shall be cast with and attached to each casting when presented for inspection. The location of the annealing lugs shall be as shown by Figs. 1 and 2.

(b) A sufficient number of test coupons to provide a test for each melt shall be cast with and attached to the coupler bodies or knuckles when presented for inspection. The size of coupon shall be sufficient to insure a machined test piece as required in paragraph 11-c, and shall be cast on the coupler bodies or knuckles at a location optional with the manufacturer. The manufacturer shall keep a record of the coupler bodies and knuckles by serial or heat numbers which have been poured from a melt for the purpose of identifying each casting in that melt.

II. Chemical Properties and Tests.

5. *Chemical Composition.*—The steel shall conform to the following requirements as to chemical composition:

Carbon	0.22 to 0.35 per cent
Manganese	not over 0.75 per cent
Phosphorus	not over 0.05 per cent
Sulphur	not over 0.05 per cent

6. *Ladle Analysis.*—To determine whether the material conforms to the requirements specified in Section 5, an analysis shall be made by the manufacturer from a test ingot taken during the pouring of each melt. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the test ingot. A copy of this analysis shall be given to the purchaser.

7. *Check Analysis.*—Check analysis may be made by the purchaser from drillings taken from the test coupons described in Section 4, paragraph (b), which have satisfactorily passed the physical requirements. These drillings shall be taken not less than ¼ in. beneath the surface. The phosphorus and sulphur content thus determined shall not exceed that specified in Section 5 by more than 20 per cent.

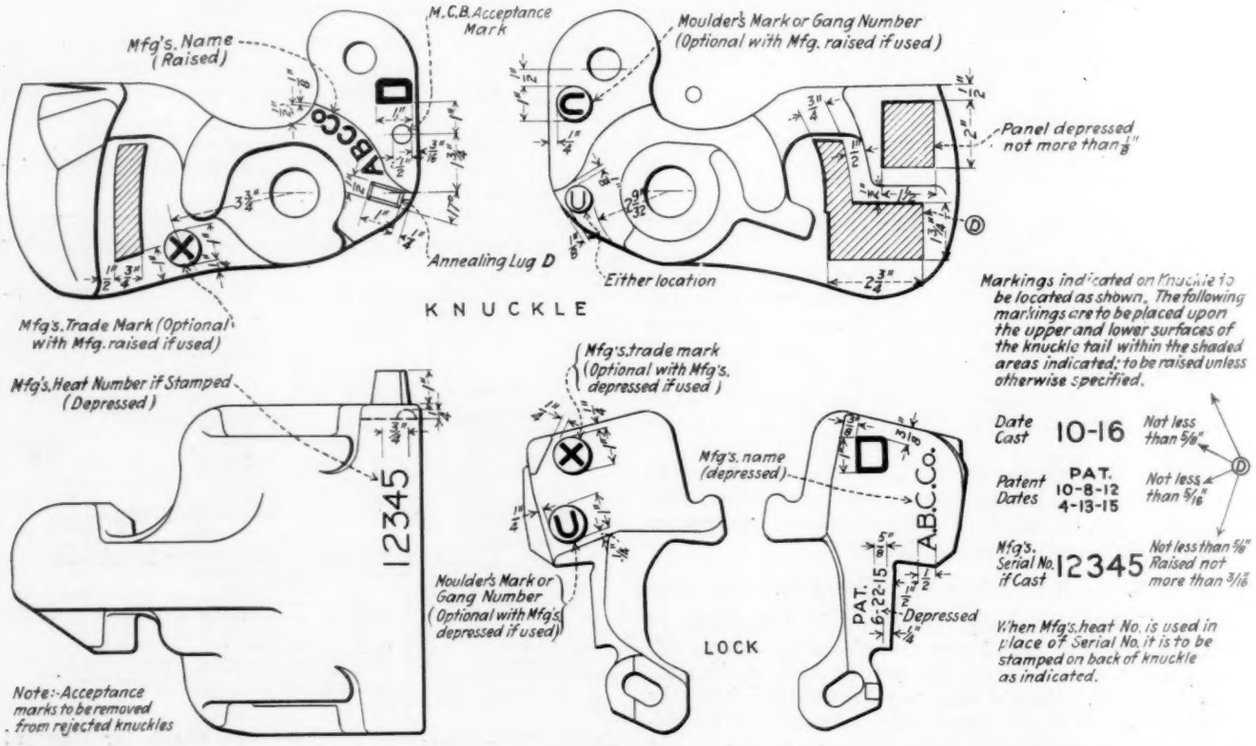

Mfg's. Name (Raised)
M.C.B. Acceptance Mark
Moulder's Mark or Gang Number (Optional with Mfg. raised if used)
Panel depressed not more than 1/8"
Annealing Lug D
Either location
KNUCKLE
Mfg's. Trade Mark (Optional with Mfg. raised if used)
Mfg's. Heat Number if Stamped (Depressed)
12345
Mfg's. trade mark (Optional with Mfg's. depressed if used)
Mfg's. name (depressed)
A.B.C.Co.
PAT. 6-22-15
Depressed
Moulder's Mark or Gang Number (Optional with Mfg's depressed if used)
LOCK
Note:- Acceptance marks to be removed from rejected knuckles
Markings indicated on Knuckle to be located as shown. The following markings are to be placed upon the upper and lower surfaces of the knuckle tail within the shaded areas indicated; to be raised unless otherwise specified.
Date Cast 10-16 Not less than 5/16"
Patent Dates PAT. 10-8-12 4-13-15 Not less than 5/16"
Mfg's. Serial No. if Cast 12345 Not less than 5/16" Raised not more than 3/16"
When Mfg's. heat No. is used in place of Serial No. it is to be stamped on back of knuckle as indicated.

Fig. 2

III. Physical Properties and Tests.

8. *Tension Tests.*—(a) The steel shall conform to the following minimum requirements as to tensile properties:

Tensile strength lb. per sq. in.	60,000
Elastic limit, per cent tensile strenght	40
Elongation in 2 in.—per cent	20
Reduction of area, per cent	30

(b) The elastic limit shall be determined by an extensometer.

9. *Annealing.*—To determine the quality of annealing, the inspector will have not less than two of the annealing test lugs, preferably those farthest away from each other, nicked and broken off from each bar and knuckle for the examination of the fracture. If, in his opinion, the anneal-

ing has not been properly done, he will require the castings to be re-annealed as prescribed in Section 3. If, after annealing or re-annealing, any casting is so much out of gage as to require heating in order to bring it within the gage limits, it shall be re-annealed before it shall be accepted. In event of failure of the inspector and manufacturer to agree upon the quality of annealing as determined by the fracture, the matter shall be arbitrated by polishing and etching a portion of the annealing lug to develop the structure and examining this under the microscope. If the structure is in accordance with Fig. 3 the material will be considered to be properly annealed, but if the structure is similar to that of Fig 4 or 5 the manufacturer shall re-anneal the castings to produce a structure like Fig. 3.

10. *Waiving Tests.*—Tests will be waived on orders for less than ten complete couplers or less than one hundred parts other than bars, in which event all castings shall preferably be from the same melt, and the manufacturer shall furnish the purchaser a copy of his record showing satisfactory chemical analysis and physical properties obtained from the melt of steel in question, and the annealing lug showing his proof of the appearance of the fracture of the annealing lugs.

11. *Test Specimen.*—(a) Test specimens shall be obtained as prescribed in Section 4.

(b) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and the manufacturer, and this casting replaced in the lot.

Fig. 3—Normal Annealing

Fig. 4—Over Annealing

Fig. 5—Under Annealing

(c) Tension test specimens shall be machined to ½ in. in diameter with a 2 in. gage length, with either blank or threaded ends to suit the holder.

12. *Number of Tests.*—At least one chemical and physical test shall be made from each melt of steel represented.

13. *Tests of Knuckle Pivot Pins.*—For each two lots of 100 couplers or less, otherwise accepted, one pivot pin shall be removed from a complete coupler and subjected to the requirements of the M. C. B. specifications for heat treated knuckle pivot pins. If this pin fails to pass the specifications, all pins in this lot of couplers will be rejected. Pins thus removed from the assembled couplers shall be replaced by the manufacturer by an additional pin after the test in order to complete the coupler.

14. *Grouping.*—The manufacturer shall have the material grouped in lots of 100 complete couplers or 100 detail parts, and this will be an inspection lot. Where possible, care should be taken to put all couplers of the same melt number in the same lot. The manufacturer should endeavor to cast as many parts from one melt on a given order as is possible.

IV. Variations in Weight and Gage

15. *Weight.*—(a) One detail part of the lots as established by Section 14 shall be weighed and come within the limits as shown in the table. Failure of any part to come within the minimum weight shall reject that detail and each such detail in the entire lot so represented shall then be weighed and every piece less than the minimum weight shall be rejected.

(b) When couplers are purchased complete and assembled, each assembled coupler shall be individually weighed and shall come within the limits as shown in the table. Detail parts shall come within the limits as shown in the table, one coupler being dismantled in each 100 and weighed.

(c) When castings are more than the allowable maximum weight as shown in Fig. 6, and all other requirements are satisfactory, castings may be accepted at the maximum allowable weight, excess weight being at the expense of the manufacturer.

Limiting Weights—"D" Coupler

		Minimum pounds	Maximum pounds
Coupler bar—5-in. by 7-in. shank—9⅛-in. butt		265	285
Coupler bar—5-in. by 7-in. shank—6½-in. butt		259	279
Coupler bar—6-in. by 8-in. shank—6-in. butt		271	291
Solid knuckle—9-in. face		97	103
Cored knuckle—9-in. face		90	96
Solid knuckle—11-in. face		101	107
Cored knuckle—11-in. face		94	100
Lock		13.5	15.5
Complete coupler—5-in. by 7-in. shank—6½-in. butt	9-in. solid knuckle..	386	416
	9-in. cored knuckle.	379	409
Complete coupler—5-in. by 7-in. shank—9⅛-in. butt	9-in. solid knuckle..	392	422
	9-in. cored knuckle.	385	415
Complete coupler—6-in. by 8-in. shank—6-in. butt	9-in. solid knuckle..	398	428
	9-in. cored knuckle.	391	421
	11-in. solid knuckle..	402	432
	11-in. cored knuckle.	395	425

16. *Gage.*—(a) Castings shall conform to the prescribed limits and gages. Five per cent of each lot of 100 or less, but in all cases at least one of the complete couplers or separate parts in each, shall be completely gaged. Assembled couplers shall be dismantled before gaging.

(b) Failure of any part in the lot to come within the gages or limits shall be sufficient cause to reject the lot so represented. Failure of a lot to meet the gages will not be sufficient cause to reject a re-offering of the same lot on the same order after the manufacturer has adjusted these parts to the gages. After this adjustment by the manufacturer, the inspector will then gage ten couplers or pieces selected at random in the lot, and failure of any to meet the gages will reject the entire lot, which shall not again be offered.

(c) The inspector shall inspect and gage each coupler in a lot in order to determine if they comply to the contour gage.

V. Workmanship and Finish

17. *Workmanship.*—(a) The castings shall conform to the size and shape as shown on M. C. B. standard drawings and shall be finished in a workmanlike manner.

(b) When assembled, knuckles and locking pins or blocks must work freely, but the lost motion between knuckles and locks must be such that the knuckle cannot be pulled forward by hand beyond the proper contour line, but ⅛ in. to ¼ in. lost motion in opposite direction is desirable.

(c) In order to determine that the requirements of paragraph (b) have been complied with, not less than ten couplers out of each lot of 100 shall be tried. Failure of any one properly to operate will be sufficient cause for rejection of the lot, but this does not prohibit the manufacturer re-offering the lot on the same order for inspection after adjustment, providing it is shown that all other requirements of the specifications have been complied with.

18. *Finish.*—The castings shall be free from blow holes, sand pockets, shrinkage cracks and other injurious defects.

19. *Sand or Shot Blast.*—All castings shall be properly cleaned by sand or shot blast or other approved process. The inspector may require that any or all castings again be subjected to sand or shot blast or cleaning in order to better examine for checks and shrinkage cracks which in his opinion would be detrimental to the strength of the castings.

20. *Welding.*—Welding minor imperfections which do not impair the strength of the castings will be permitted when done under the jurisdiction of the inspector and by a practice approved by him. All castings shall be re-annealed after such welding.

VI. Inspection and Rejection

24. *Inspection.*—(a) The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture, test and inspection of the material ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy himself that the material is being furnished in accordance with the specifications.

(b) The purchaser may make the chemical test to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such chemical tests, however, shall be made at the expense of the purchaser.

(c) The physical tests may be made at the plant of the manufacturer, providing the purchaser is satisfied with the accuracy of the test machine and that the pulling speeds for determining the elastic limit and ultimate strength are in accordance with the recommended practice of the American Society for Testing Materials for two-inch test piece.

(d) All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

(e) After the inspection and tests have been completed and before castings are loaded, at the option of the purchaser, all remaining annealing lugs shall be removed and surface where located put in a workmanlike condition.

25. *Rejections.*—(a) If any of the test coupons or annealing lugs selected to represent the melt do not conform to the requirements specified in Sections 7, 8 and 9, the lot will be rejected.

(b) The basis of acceptance of physical tests shall be upon test coupons showing clean fracture without blow holes or imperfections and that break within the middle third of gage length. In event the test coupon is imperfect or breaks outside of the middle third of the gage length, additional test coupons shall be furnished, but this shall be the only cause for rehearing for the physical tests, except as specified in paragraph 3 (b).

(c) All castings which show any injurious defects or do not conform to the weights or gages shall be rejected.

(d) From each bar or knuckle rejected by the inspector

under these specifications, he shall cause to be chipped the M. C. B. acceptance mark shown on Figs. 1 and 2.

Discussion and Action Taken

R. L. Kleine (P. R. R.): Five of the six coupler manufacturers are now in position to turn out the M. C. B. standard couplers. They all have received the gages and are satisfied with the specifications as they have been developed jointly between the manufacturers and the coupler committee.

F. W. Brazier (N. Y. C.): The interesting part of the coupler situation is that the government after the 51 years of existence of the Master Car Builders' Association, has looked upon us as knowing what a good coupler is and adopted it. May I ask if the government accepted No. 10 contour line?

Mr. Kleine: As far as I know they have adopted No. 10 couplers as standard for cars.

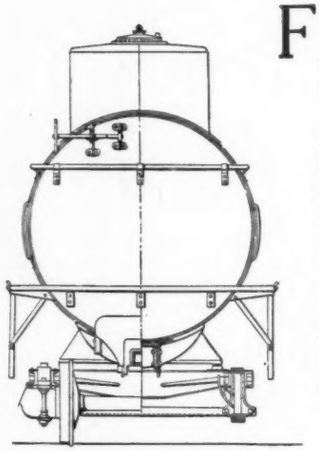
Mr. Brazier: I think we may as well adopt the No. 10 contour line as we must have it.

C. F. Giles (L. & N.): Shortly after the convention of 1916 we built a large number of cars to which we applied this stand coupler and it has proved highly satisfactory. I have no report of a single failure of one of the couplers since. It has practically eliminated broken knuckle pins whereas we had thousands of them with the old type.

A. Kearney (N. & W.) I move that such parts of the report as the committee has recommended to be submitted to letter ballot be so handled.

The motion was carried.

The Report of the Tank Car Committee



FOR THE YEAR 1918 the Tank Car Committee does not recommend that the existing specifications be disturbed.

Owing to the conditions brought about by the war, it has been necessary to suspend some of the requirements, as, for instance, that of the use of flange quality steel in the construction of Class III tanks, and that of hydraulic retests of all classes of tanks, the former until July 1, 1919, and the latter until January 1, 1920.

Safety Valves

Leakage. — The principal complaints regarding the details of the tank cars have come from the field producing casing head gasoline, and, in brief, were that the safety valves were not tight, and did not adequately relieve the pressure, as it was claimed locomotive pop valves of the same size would do.

The committee secured a number of sample safety valves and subjected them to tests, mounting them on a large drum and supplying steam from a locomotive boiler. The committee has in its possession an extensive report, giving the performance of each of these valves as originally assembled, and also as reassembled with parts of the different valves. As this report is very voluminous it is not included here, but a copy will be filed with the secretary of the Association.

It developed that all of the valves tested had a capacity very much better than any locomotive pop valve of the same diameter, for the reason that the lift was several times as great. The complaint regarding the lack of capacity was evidently made under a misapprehension, due to the method of making the test. If the valve is mounted on a container of small volume, the initial movement of the valve relieves the pressure, so that the amount of lift is hardly measurable. On the other hand, if the container is of large size, as in actual service, the lift is very great, one pound increase above the popping pressure producing in the best valves a vertical lift of about 0.3 in. This is shown by diagram P.2738. For comparison, diagram P.2745 is given, the valve having the same housing, but a clapper from which the maker had entirely omitted the outside huddling lip. (See Fig. 1.)

It was found that the standard dimensions of the safety valve are not always followed, and that in the case of individual valves the deviations resulted in a reduction of the possible capacity by nearly one-half.

During the tests it developed that there was apparently a very close relation between the inner edge of the lip at the lower periphery of the clapper and that of the outside corner of the seat. The best performances were obtained when the plane of the valve seat and that of the under side of the lip most nearly coincided, in which case the actual clearance was that due to the difference between the out-

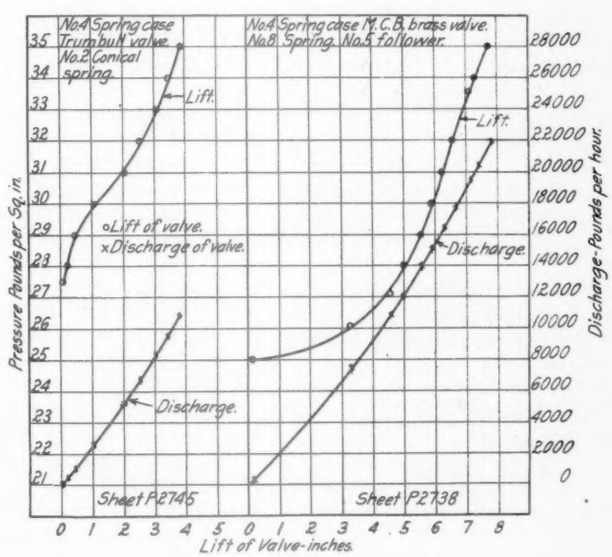


Fig. 1—Safety Valve Lift Tests

side diameter of the seat and the inside diameter of the lip on the clapper.

So far as the tests have gone no valve has proved to be absolutely tight up to popping pressure. After the seats were ground the valves were assembled for test on the drum, and water poured into the cavity above the clapper. The leakage was principally in the form of isolated bubbles to within a few pounds of popping pressure. The point at which leakage ceased when the valve closed differed with each valve.

A conical valve will fit a conical seat only when the axes strictly coincide, the reason being that the only circular conic section is that normal to the axis. With any tilting the section becomes elliptical. This explains why valves are

tight in one position and not tight in another. There is also the possibility that after the valve has been ground to fit the seat, the seat and the body of the spring case may be distorted when the valve is screwed into the fitting on the tank car. As a result of the tests the committee believes that if the condition of the valve is maintained, the leakage with the present standard design will not be very serious.

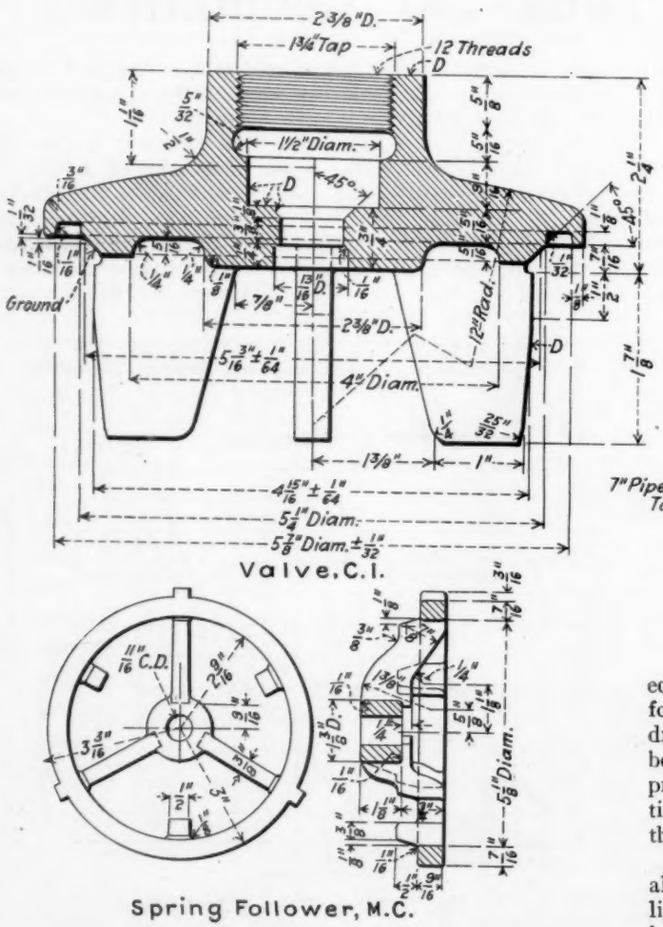
Corrosion.—It is understood that the most serious corrosion has been with casinghead gasoline and its blends. With the Class IV insulated tank car which is intended for handling this material, the increase in the temperature of the liquid is slow and the development of pressure should be very moderate. Where the product is handled in uninsulated cars the outage from leakage will naturally be greater.

Some concerns have experimented with non-corrosive seats as suggested by the committee. It develops that the iron valve resting on the non-corrosive seat is subject to serious corrosion, and it is evident that both the seat and the clapper must be of a material not affected by the corrosive qualities of some of the gasolines. Brass clappers in the valves could hardly be seriously considered, because of the temptation to theft. The clapper, while non-corrosive, should have little intrinsic value. The presence of the wings precludes the application of a pressed ring, but the committee hopes that it will be able to produce a valve in which the material forming the seat is welded in place autogenously, and that by this means the difficulty from corrosion will be overcome.

The committee is not prepared to submit drawings showing the details of non-corrosive seats in housing and clapper until after the experimental ones have been subjected to long test. In the meanwhile, the committee will be very glad to consider any design submitted.

Changes in Standard Drawings.—Examination of the valves tested indicated that sufficient attention had not been given to strict compliance with the standard drawings. Therefore, the committee has made some modifications in Figs. 9-A and 10-A of the standard specifications for tank cars, as follows:

Spring Case, (both Figs. 9-A and 10-A).—A dimension has been added for the top diameter of the bevel seat, fixing it at 5 3/16 in., with a tolerance plus or minus of 1/64 in. At the same diameter on the conical seat of the valve the plane of the outside lip will be 1/32 in. above the plane of the seat in the spring case, allowing that much for regrinding before the lip gets to the level of the flat seat. The same tolerance without change of dimension has been added for the diameter of the outside edge of the flat face, and for the diameter of the cylindrical opening in the seat. The dressing has been made to include the seat for the spring, both the flat portion and the diameter. This is necessary to prevent the spring being cramped owing to foundry variations. It is intended that the diameter shall not be less than the 6¼ in. called for.



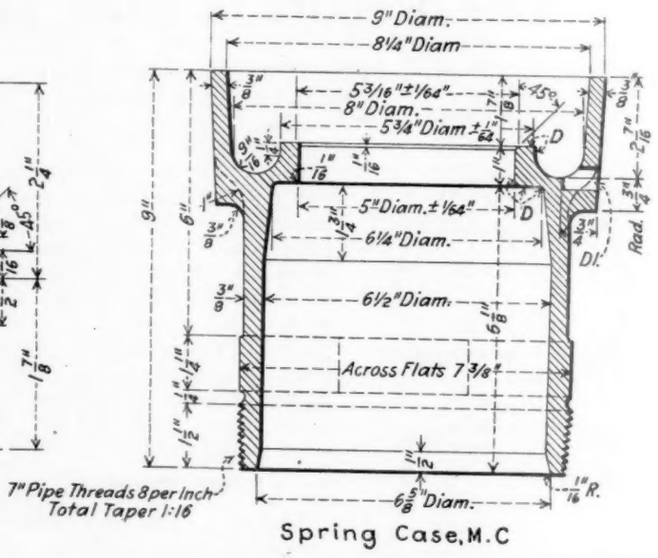


Fig. 9—A—Corrected Drawing of Valve, Spring Follower and Spring Case for 5-inch Safety Valve Applied to Side of Dome

For the clapper (Fig. 9-A), in addition to the dimensions already referred to, which will fix the vertical relation of the lip to the corner of the flat seat in the housing, dimensions have been added for tolerances for the variation in the inside diameter of the lip and for the outside diameter over the wings. This is necessary, as it has been found that such variations exist in the dimension over the wings and in the opening through which the wings pass that in some cases actual sticking has occurred. All of these dimensions are machined ones and it is believed that the tolerances are not unreasonably close. The committee expects to prepare drawings for reference gages fixing the essential dimensions.

It is unfortunate that when in 1903 tank cars were first equipped with safety valves of adequate discharge capacity, the only products to be considered were refinery gasolines and other heavy oils. The normal pressure of these gasolines was so low that the original valve settings of 8 lb. when one valve was used and 8 and 12 lb. when two were used, met

all conditions. The governing requirement then was that the valve should adequately vent the tanks in case they were exposed to fire. It was not expected that higher settings would be required and the valves were designed from the safety standpoint. With the springs used the clearance around the wings of the valve was ample. When it became necessary to provide for the 25-lb. setting it was felt that the changes should, if possible, be confined to the substitution of a heavier spring than that in the original design. The outside diameter of the coil being practically fixed by the casing, an increase in the diameter of the wire reduced the

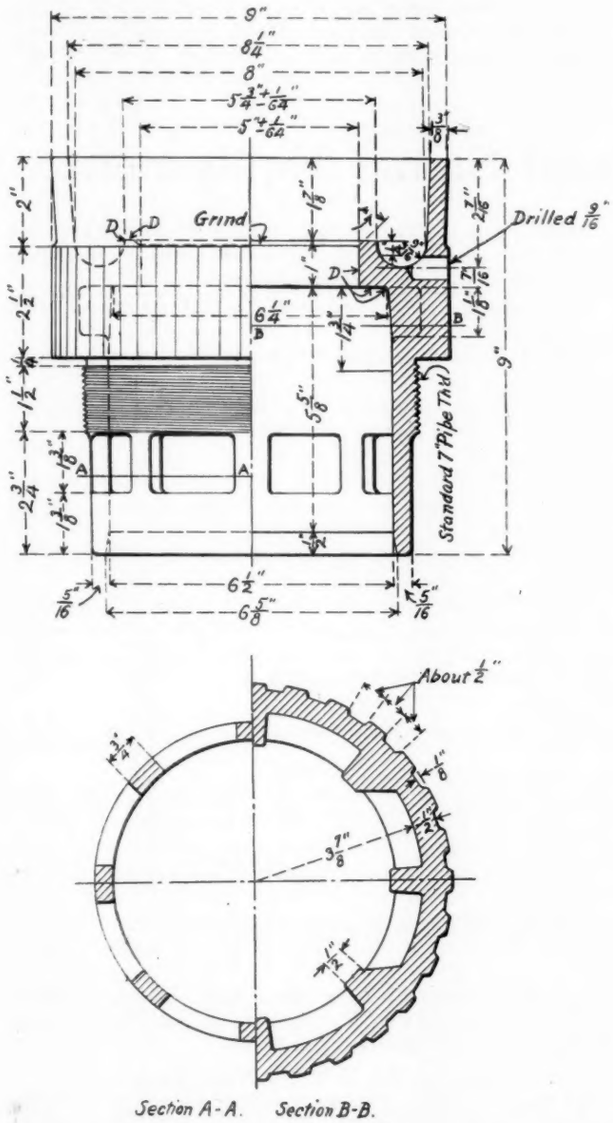


Fig. 10—A—Corrected Drawing of Spring Case for 5-inch Safety Valve Applied to Top of Dome

clearance between the inside of the coil and the wings of the valve encircled by the coil. Where the workmanship of the springs is good not much interference need be expected, but with carelessly made springs there is probably interference, explaining why valves tight in one position may leak when turned to another.

One of the valves tested had a seat 15 deg. to the vertical. This valve stuck to a dangerous extent, and the committee does not feel warranted in recommending any change from the present standard angle of 45 deg.

Experience has developed that some of the details of the valve, shown by Fig. 9-A of the specifications, should be modified:

The drawing of the spring follower shows three small lugs which engage the flat faces of the nut on the bottom of the valve stem. It was believed that the valve could be rotated on its seat without causing the stem to turn in the threaded nut, but it has been found in practice that turning the valve around on its seat has a tendency to loosen the bottom nut, thus changing the setting of the valve. With existing valves this can be most easily provided against by the use of two nuts jammed on the bottom of the thread, with a washer above the upper nut of sufficient thickness to prevent the lugs on the under side of the follower engaging the nuts. For future valves it is recommended that the depth of the base be increased from 7/8 in. to 1 1/8 in. as shown in Fig. 9-A, which will eliminate these lugs.

The angle of 45 deg. for the under side of the valve stem head has been indicated.

Safety Valve Applied to Top of Dome. Fig. 10-*A.*—The thickness of the skirt below the threaded portion of the spring case has been reduced from 3/8 in. to 5/16 in., without changing the inside diameter, because of complaints that owing to foundry variations the skirt would not in all cases pass through the threaded opening in the collar on the dome, except by machining all over. As the skirt has no function other than to guide the lower end of the spring, there is no reason why the 1/8 in. additional freedom should not be allowed.

It has developed that the arrangement of the inside radial ribs, shown by section *B-b* of the spring case, results in foundry difficulties, and that to avoid these some valves have been made with four ribs instead of eight as called for. As these ribs are intended to center the spring, none of them should be omitted, but their form has been modified as shown on the drawing of the case in Fig. 10-A to provide proper draft in molding.

The surfaces to be dressed (D) have been indicated on the drawing of the spring case. These are the same as in Fig. 9-A, and should have been shown when Fig. 10-A was prepared.

Apparatus for Testing Safety Valves in Place on Cars.—It has been found that while the apparatus shown by Fig. 13 of its specifications, is sufficiently strong for testing valves with 12-lb. setting, it should be strengthened for use with the 25-lb. setting, and the committee has revised the design which it recommends be substituted for the present design. The figures for the "Scale Reading in Lb.", page 42, should be changed in the case of the 25-lb. setting to a minimum of 430, and a maximum of 550, to agree with those on the revised print which are correct for the 3-lb. tolerance adopted last year.

Class V Car

During the year a number of Class V cars have been built for handling liquefied gases, and the committee hopes that in time such welded tanks will be available for ordinary commercial shipments. While the specifications call for a hydraulic test of 300 lb. per square inch, the manufacturers of their own volition have been testing the welded tanks to 500 lb. pressure.

The committee has approved designs for the safety valve, the inlet and outlet valves, their arrangement in the dome head, and the protective housing.

Section 20 (b) of the specifications, provides that the safety valve shall be of the flanged type. In order to get a satisfactory arrangement of the valves in the dome head the committee accepted a design of safety valve with a screw fit, believing that this could be safely used as the safety valve

is not manipulated after being applied as is the case with the inlet and outlet valves. To cover this feature, the committee recommends that the word "preferably" be inserted between the words "shall" and "be", so that the requirement will read: "Valve shall preferably be of the flanged type, etc." The requirement that the design of the valve must be approved, remains.

The government in ordering tank cars for general service has accepted the Master Car Builders' Specification for Class II car.

The report is signed by: A. W. Gibbs, chairman, Pennsylvania; Thomas Beaghen, Jr., Union Tank Line; C. E. Chambers, C. R. R. of N. J.; Wm. Schlafge, Erie; S. Lynn, P. & L. E.; John Purcell, A. T. & S. F., and O. J. Parks, General American Tank Car Corporation.

Discussion and Action Taken

C. E. Chambers, (C. R. R. of N. J.): The committee has gone to a great deal of trouble and spent much time trying to ferret out the trouble with the safety valves. It found large spring irregularities and irregularities in the material and sizes. It has been very difficult to find a spring that would pop at the proper pressure and close at any given pressure. Several of the springs would be almost tight up to 20 lb. and then commence to blow a little bit and let loose at 25 lb. They would not seat until they got down to 3 lb. pressure with quite a considerable blowing all the way down. The tests are still being carried on.

Mr. Chambers moved that the association grant $500 more for the continuing of this test. The motion was carried and the report was accepted.

Report on Train Brake and Signal Equipment

T. L. Burton
Chairman

THE COMMITTEE submitted the following report:

Part 1—Water Raising System

J. E. O'Hearne, superintendent motive power, Chicago & Alton, having reported improper performance of brakes on passenger cars having a water-raising system in conjunction with L triple valves and suggesting that the air supply for the water-raising system on cars with this type of triple valve be taken from the air pipe leading from the triple valve to the supplementary reservoir, adjacent the former, the subject was considered in conjunction with practically all types of passenger brakes. The committee believes that, as a fundamental principle, when the water-raising system is used on cars whose air brake equipment includes an air reservoir, which is supplementary to the auxiliary reservoir, the air supply for the water raising system should be taken from the reservoir in which the air pressure is not reduced during service brake applications. On this basis the air supply should be taken from the following points in the brake system with the types of brakes mentioned below:

(a)—Schedule PM—from the auxiliary reservoir.
(b)—Schedule PC—from the emergency reservoir.
(c)—Schedule UC—from the emergency reservoir.
(d)—Schedule LN—from the supplementary reservoir.

Where a cut-out cock is used in the brake system for cutting out the supplementary or emergency reservoir, the air connection for the water-lifting system should be made between the reservoir cut-out cock and the triple valve or control valve.

Part 2—Charges and Credits for Repairs to Triple Valves

J. J. Tatum, superintendent freight car department, Baltimore & Ohio, suggested the advisability of a fixed charge and credit covering the substitution of a triple valve in good order for a defective valve, or a valve due to be cleaned and lubricated, in lieu of a standard charge for cleaning and oiling, with additional charges for repairs, the object being to have one fixed charge for all triple valves applied and a fixed credit for all valves removed, regardless of conditions, so as to facilitate billing.

The committee does not concur in this recommendation for three reasons:

First: the charge should be proportional to the service rendered.

Second: the inauguration of such a scheme would necessitate a difference between charge and credit which would be in excess of the present charge for cleaning and oiling only, and less than the present permissible charge for repairs, thereby tempting a road handling foreign cars to neglect entirely the question of repairs and to confine attention to the more profitable job of cleaning and oiling for which the authorized charge would be excessive.

Third: granting that the proposed method if adopted would not encourage "bad practice" on the part of repair men, considerably more time and labor would be required than is now available in arriving at a satisfactory credit and charge price.

Part 3—"A" and "B" End Double Cylinder Passenger Cars

A non-member of the association having raised the question as to how the *A* and *B* ends of passenger cars having two brake cylinders, with their pistons travelling in opposite directions, could be determined, the subject was referred to this committee, evidently because of the brake cylinder and direction of piston movement being used as a means of designating the *A* and *B* end of single cylinder cars.

The committee could devise no practical scheme whereby the *A* and *B* end of double cylinder cars could be properly designated by any part of the brake.

Part 4—Triple Valve Test Rack

The drawings shown in Fig. 3 between pages 474 and 475, 1917 Proceedings, shows an operating handle *R* which, as far as the committee has been able to learn, has never been made a part of the test rack, what is known as a "blocking device" being used instead. As the blocking device serves every purpose anticipated through the use of the operating handle referred to, and is in quite general use, it is the recommendation of the committee that the triple valve test rack drawing, Fig. 3, be revised in accordance with exhibit *A* of this report, and that the first paragraph at the top of page 484, 1917 Proceedings, pertaining thereto, be revised to read:

"During this test there must be a steady exhaust of air from the vent port of valve *B* to insure the proper differ-

ential being maintained on the triple valve piston. If, in making this test, the triple valve for the 8 in. cylinder releases or indicates excessive ring leakage make another test, after blocking the triple valve piston in service lap position."

Part 5—Cleaning Air Brakes

At the last convention of the Air Brake Association, the following resolution was adopted:

"It is earnestly and unanimously recommended that the Master Car Builders' Association quickly supplement interchange rule No. 60, at least for the duration of the war, so that foreign car brakes bearing cleaning stencils nine months old or more may, when on repair or other tracks where the work can be done, be cleaned and repaired and the proper charges made against the owning road.

"This does not change the present rule which makes a twelve months old stencil or over an ineffective brake and permits switching of the car at will to the repair track. It does not suggest that cars stenciled nine or ten months be switched to repair tracks, it is merely to take the greatly needed advantage of such cars being on tracks where the work can be done to do it, without in two or or three months having to switch them and take them out of service when they are so greatly needed, and incur the additional expense of switching, which is more than the cost of cleaning."

The committee has carefully considered the above resolution and earnestly recommends its early adoption by the M. C. B. Association, if concurred in by the proper committee on rules. In fact the practice on many roads is to clean, oil and test brakes on home cars when the stencil dates are approximately nine months old, providing the car is out of service where help and facilities are available for doing the work properly, but are not permitted to bill car owners for similar repairs to foreign cars, unless the brakes are tested and their condition determined before cleaning the cylinder and triple valve. The recommendation of the Air Brake Association also harmonizes with M. C. B. rule No. 1.

The report was signed by T. L. Burton, chairman, consulting air brake engineer, N. Y. C.; B. P. Flory, N. Y. O. & W.; J. M. Henry, P. R. R.; L. P. Streeter, Ill. Cen.; R. B. Rasbridge, P. & R.; W. J. Hartman, C. R. I. & P.; and G. H. Wood, A. T. & A. F.

Discussion

T. L. Burton (N. Y. C.): Mr. Henry suggested that the committee should have recommended another triple valve test rack and should have made a definite recommendation on designating the *A* and *B* ends of double cylinder pas-

Description of Cocks Required.

Cock No. 1. ¾ in. three-way cock having ⅜ in. side outlet.
Cock No. 2. ¾ in. cut out cock.
Cock No. 3. ¾ in. cut out cock.
Cock No. 4. ½ in. cut out cock.
Cock No. 7. ½ in. cut out cock.
Cock No. 8. ½ in. cut out cock.
Cock No. 9. ½ in. cut out cock.
Cock No. E. ¾ in. cut out cock.
Cock No. F. ½ in. cut out cock.
Cock No. X. ½ in. three-way cock with two ⅜ in. side outlets.
Cock No. Y. ¾ in. cut out cock.
Cock No. Z. ¾ in. cut out cock.
Two ¼ in. drain cocks.

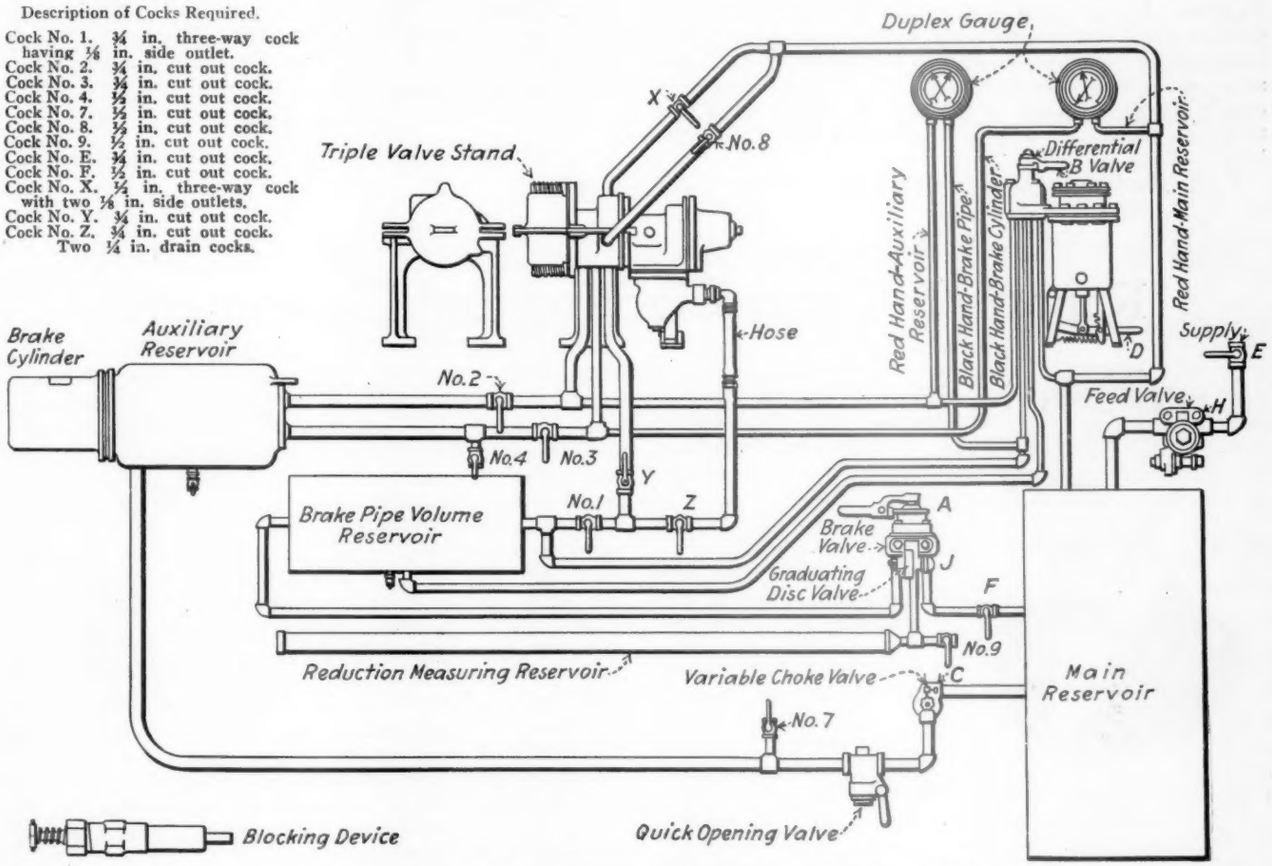


Exhibit "A"—Assembly Diagram, Triple Valve Test Rack. Fig. 3.

senger cars. Unfortunately he could not be present at the time these subjects were discussed or I think he would have been fully in accord with the views of the committee.

T. H. Goodnow (C. & N. W.): The charge for cleaning, including the testing of the triple valves and also including the repairs, is the matter that was left open in connection with the report of the Arbitration Committee. I got the impression from Mr. Burton's remarks that his committee was going to make a recommendation as to a charge for that, but I see instead it has discouraged the practice. I am somewhat surprised at the reason that it gives. I do not believe that the question of charges is going to have anything to do with the working of the triple valve, especially under present conditions. It is to the benefit of no one to take advantage of an opportunity of not doing honest work.

The Arbitration Committee went very carefully into this matter and the arbitrary figure set for doing this work is based on several thousand cars and the experience of three or four roads. *I feel that so long as charges for work are going to be continued the divided costs as now shown in the rules should be withdrawn and the arbitrary figures recommended in the Arbitration Committee's report adopted.*

T. L. Burton: As was stated the committee felt in arriving at the conclusion in Part 1 of the report, that any so-called average price that might be fixed for doing anything to a triple valve, from cleaning and oiling it up to and including heavy repairs, would not result in the maintenance of the equipment to the standard at which it should be maintained. The price for cleaning and oiling a triple valve, is about 50 cents. We know that the cost of repairs, exclusive of bushings and parts mentioned by the Arbitration Committee, will run as high as $10. That is the actual cost of doing the work, not the cost proposed in the M. C. B. rules. Do you think a man will hold himself down to doing a two dollar job and get a dollar for it, when he can keep busy on a 50 cent job and get 75 cents for it? The result as we see it will be that there will be no repairs made, except in remote cases, and it was with the thought of at least trying to maintain a reasonable standard that I raise the issue.

T. H. Goodnow: The committee fully understands that an individual triple might cost $8, and also took into account the hundreds of triples that would have only cleaning and testing, at an average price of $1.10. I feel assured that Mr. Burton is overlooking the fact that there is only one railroad and one company's cars at the present time.

T. L. Burton: I am not overlooking that.

T. H. Goodnow: I think that it is entirely a matter of honesty. The Arbitration Committee stands back of the arbitrary figure of $1.10 as representing the average cost, and in that we have the advantage of the knowledge of the special committee which for some time has been checking this work all over the country.

J. J. Hennessey (C., M. & St. P.): It seems to me that Mr. Burton has lost sight of the fact that the basic principle of the M. C. B. rules is common honesty. If you wipe that out there is nothing left to the rules.

E. W. Pratt (C. & N. W.): If this is a matter of averages why is any charge made at all?

Mr. Goodnow: There has been no authority given up to the present time to eliminate charges for car repairs and the charge in question is an item of car repairing and therefore so far as we know to be continued at the present time.

Action Taken

The recommendation of the Arbitration Committee was accepted.

Report on Train Lighting and Equipment

J. R. Sloan
Chairman

THE committee, as recommended in last year's report, took up the question of standardization of ball bearings for axle generators. The 412 bearing in ball annular size had been made recommended practice for truck hung axle generators and had been generally adopted by the generator manufacturers previous to the advent of the body hung generator. When the committee took the matter up it found that body hung axle generators were on the market, using the following sizes of ball bearings, viz., 304, 307, 308, 312, 407, 408, 409, 410, 411 and 412, a total of ten different sizes.

The committee obtained from the axle generator manufacturers all data relative to the various types of axle generators they were building or contemplated building, necessary to determine the proper size of bearing to use. This information was transmitted to the ball bearing manufacturers, who formed a committee and made recommendations as to the size of bearing that should be used in each case.

A joint meeting of the representatives of the ball bearing manufacturers, axle generator manufacturers and this committee was then called. At this meeting the following recommendations were unanimously adopted:

1. *Truck hung generators:* All truck hung generators should use the 412 size bearing.

2. *Body hung generators:* (a) Body hung generators requiring, to transmit the necessary power, a 3 in. belt or smaller, to use the 407 size. (b) Body hung generators requiring, to transmit the necessary power, a 4 in. belt, to use the 409 size. (c) Body hung generators requiring, to transmit the necessary power, a 5 in. belt, to use the 412 size.

3. The same size of bearing should preferably be used on both pulley and commutator ends, but if desirable from a design and manufacturing point of view, the following sizes of bearings may be used at the commutator end: (a) Those requiring to transmit the necessary power, a 4 in. belt, may use a 407 bearing. (b) Those requiring to transmit the necessary power, a 5 in. belt, may use a 409 bearing.

After arriving at this agreement, the Franklin Railway Supply Company discovered that to use this 407 bearing on their T-35 generator would entail a redesign and would result in a design that would not be in proportion to the balance of the equipment. They, therefore, requested that they be allowed to use the 404 bearing on this size of generator, to which the committee unanimously agreed.

The committee would, therefore, recommend that the following sizes of ball bearings be accepted as recommended practice for axle generators:

Truck Hung	Body Hung						Franklin Railway Supply Co.
	Width of Belt Required to Transmit Necessary Power						
	5 Inch			4 Inch		3 Inch	T-35
Both Ends	Pulley	Commutator		Pulley	Commutator	Both Ends	Both Ends
412	412	*412	†409	409	*409	†407	407	404

*Preferred. †Alternate.

The committee also took up the question of the rating of axle generators referred to in last year's report and have made a series of tests as to the temperature attained by the generator in service on the road and on the bench. While these tests have been completed, the work was finished so recently that the committee has not been able to study it and will, therefore, present a report on this subject next year.

The members of the committee have been asked as to what was the intent of its recommendations in the 1917 report as to changes in the Passenger Car Rules. In order to make the matter clear we would advise as follows: 1. That

the rate per car mile which the owning road was permitted to bill the handling road was intended to cover *all* expense in connection with electric car lighting. 2. That *all* expenses incurred, while the car was on a foreign road, in maintaining the electric car lighting equipment, were chargeable against the owner unless due to unfair usage, derailment or accident.

The report is signed by: J. R. Sloan, chairman, Pennsylvania; C. H. Quinn, N. & W.; D. J. Cartwright, Lehigh Valley; E. W. Jansen, Illinois Central; E. Wanamaker, C. R. I. & P.; Alex. McGary, N. Y. C.; L. G. Billan, B. & O.

Discussion and Action Taken

W. R. McMunn (N. Y. C.): Is it the intention that we should charge for inspection as well as repairs?

J. R. Sloan (Pennsylvania): All expenses should be included. There is a lot of inspection made when the car is on a foreign road and considerable labor expended in making such inspection when it is not necessary. Where inspection is necessary I think the labor should be charged against the owning road.

Mr. McMunn: I think it is entirely improper and in conflict with rule No. 1 of the M. C. B. Passenger Rules. I object to it further on account of the impracticability of checking the character of the inspection made to the electrical apparatus on the cars and because of the fact it will complicate the car repair bills.

I. S. Downing (Big Four): *I move that this matter be referred to the arbitration committee.*

F. M. Waring (Pennsylvania): The inspection of electric lighting equipment is done by special men—experts—and the work is entirely different from the ordinary run of inspection for safety. I think it is a proper charge against the car owner.

Mr. McMunn: I think the proper thing is to let these men make the inspection and if they find defects in making the inspection let them charge for any repairs.

C. F. Giles (L. & N.): There is not any more reason why there should be a charge made for inspecting electric lighting equipment than for making a charge for inspection of any other part of the car.

M. R. Reed (Penna.): I do not think that the cost of inspection of this electrical equipment should enter into the expense chargeable against the owner.

Mr. Sloan: The only inspection we had in mind was inspection made at a terminal enroute and was not to be made unless advance information was received that the car was in trouble. (Mr. Downing's motion was carried.)

Report on Standards and Recommended Practice

T. H. Goodnow
Chairman

THE FOLLOWING is a report covering such subjects as have been referred to this committee during the past year:

Wheel Defect, Worn Coupler Limit, Worn Journal Collar and Journal Fillet Gage. (Standard.) Page 440. Sheet M. C. B. 16. A member suggests that the standard wheel defect gage be changed to show a radius of 5/16 in. at the lower right-hand corner and a radius of 3/8 in. at the lower left-hand corner for the purpose of checking the fillets of journals. The committee concurs in this suggestion.

Box Car Side Door Fixtures. (Standard.) Page 715. Sheet M. C. B. 30. A member calls attention to considerable trouble being experienced with the breaking of house car door fastenings, due to the failure of the door hasp through the eye-hole. The committee refers this to the Committee on Car Construction.

Center Plates. (Recommended Practice.) Page 535. Sheet M. C. B.—F. A member recommends that this be advanced to standard, eliminating the center plate shown on Sheet M. C. B. 20. The committee refers this to the Committee on Car Trucks.

Definitions and Designating Letters of General Service Freight Equipment Cars. (Recommended Practice.) Pages 738-743. Through the secretary, a communication was received from the General Chemical Company, requesting the appointment of a classification for a steel tank of M. C. B. construction (Class 2) equipped with a combination concrete and lead lining. The committee concurs, and suggests the following:

"TL"—Acid Tank. Of same general construction as oil tanks, but having lead lining.

The report is signed by: T. H. Goodnow, chairman, C. & N. W.; C. E. Fuller, Union Pacific; A. R. Ayers, N. Y. C. & St. L.; O. C. Cromwell, B. & O.; O. J. Parks, German-American Car Lines; R. E. Smith, Atlantic Coast Line; C. F. Thiele, Pennsylvania Lines; and A. G. Trumbull, Erie.

Discussion

T. H. Goodnow, (C. & N. W.) chairman: Since this report was made, the question of the change in the width of the 4¼-in. by 8-in. and 5½-in. by 10-in. journal bearings, as made last year, has been brought to the attention of the committee on standards. That change was made on the recommendation of J. T. Wallis, chairman of the Car Truck Committee. This was brought up by a number of different members of the association and by C. B. Young who is in charge of the tests and inspection at Washington. Mr. Young wrote a letter to the committee as follows:

"I wish to call your attention to the fact that the M. C. B. Proceedings for 1917 show that the bearings for 5½-in. by 10-in. and 4½-in. by 8-in. axles were changed so that the over-all width of the bearings was increased to 5⅜ in. and 4⅜ in., respectively. The drawings for the gages for these bearings, shown on M. C. B. Sheet 14, have not been revised since 1913, and, therefore, are for the narrower or old style bearing. Also the wedges for these bearings have not yet been changed in the M. C. B. Proceedings for 1917. If I read the drawings in the M. C. B. 1917 Proceedings correctly the slope of the sides will not be the same as before, and, therefore, the gages and wedges will not fit and will result in endless difficulty and confusion."

Prior to that time I had referred the matter to Mr. Wallis, as it originally came up through his committee, and I have received the following letter from Mr. Wallis.

"In regard to increasing the overall width of 4¼-in. by 8-in. journal bearing shown on M. C. B. Sheet 6 from 4⅛ in. to 4⅜ in., and increasing the overall width of the 5½-in. by 10-in. journal bearing shown on M. C. B. Sheet 12 from 5¼ in. to 5⅜ in., so as to provide sufficient material

on the edge of bearings after boring out for 5/16 in. lining metal, I would advise that the increasing of the width of these bearings in no way involved a change in the dimensions in the back of the bearing, nor of the journal bearing wedge; neither was this recommended in our letter of March 23, 1917.

"It appears that these dimensions were improperly applied to sheets 6 and 12 of the M. C. B. Proceedings. By connecting the crown with the increased dimensions for width, the slopes of the sides of the bearings were changed. To retain interchangeability and make no change in the design of the back of the bearing, the following additional dimension should have been corrected on these sheets: on M. C. B. Sheet 6, the vertical dimension of 7/8 in. at the end of the slope should have been changed to 23/32 in.; on M. C. B. Sheet 12, the vertical dimension of 1 1/8 in. at the end of the slope should have been changed to 1 1/16 in."

Not having the opportunity to get the committee on standards together, I assumed the authority to advise Mr. Young in accordance with Mr. Wallis's letter. I would suggest that this be made a part of the report and sent to letter ballot and in the meantime the secretary should be instructed to send out a pamphlet or notice calling attention to this error in the wedges in the M. C. B. Proceedings. I presume Mr. Dunham will also want to make that change in the Master Mechanics' standards. Mr. Young wanted something on this and it couldn't be delayed because he had to have it in getting out material for the new cars.

Action Taken

The President: I don't see why that could not be handled on the floor.

I. S. Downing (C. C. C. & St. L.): I make a motion that we leave it to the truck and standards committee to get out the necessary circular.

The motion was carried and the report accepted.

Report of Committee on Car Wheels

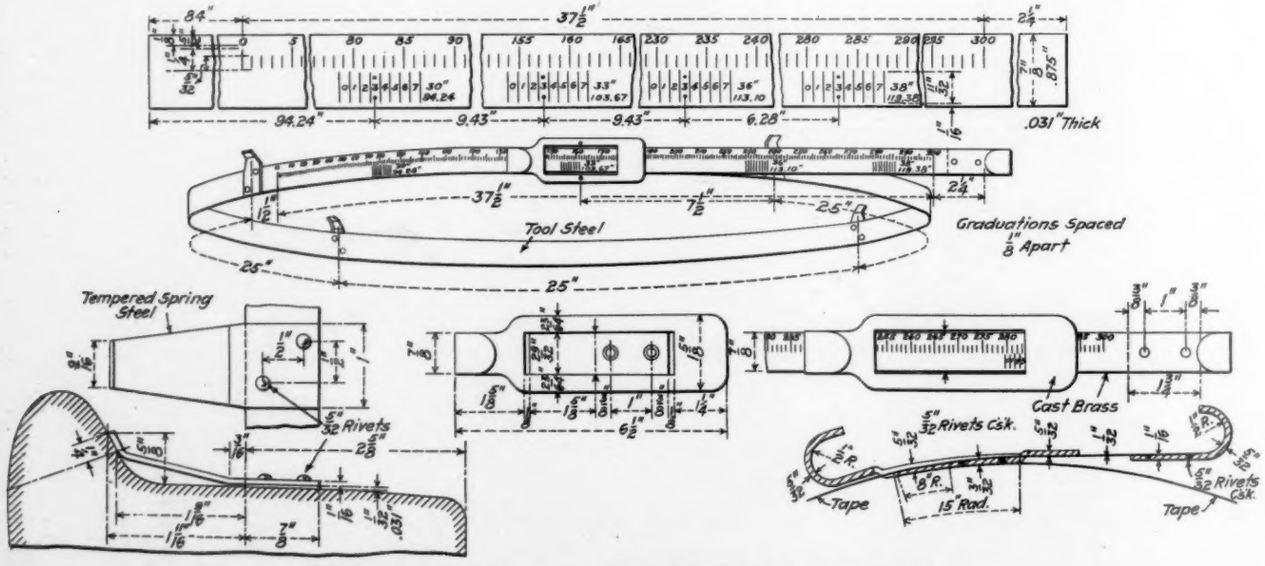
W. C. A. Henry
Chairman

THE COMMITTEE ON STANDARDS and Recommended Practice in its report submitted in 1917 recommended that the circumference measure for steel and steel-tired wheels, as shown on M. C. B. Sheet "C," be advanced to Standard for steel, steel-tired and cast-iron wheels, and that the circumference measure for cast-iron wheels, Sheet M. C. B. 16A, be eliminated. This recommendation was submitted to letter ballot and carried, no change being made in specifications for cast-iron wheels.

Much confusion has arisen as this gage can not be used in connection with the specifications for cast-iron wheels as they now read. In order to meet the situation and at the same time require but one circumference measure it is recommended that the circumference measure for steel, steel-tired and cast-iron wheels be modified as shown on the plate herewith.

The proposed gage differs from the present standard gage as follows: The length of the band is increased 5 in. in order to take care of the 38-in. diameter steel and steel-tired wheels. The markings for steel and steel-tired wheels occupy but half the width of the band, the markings for cast-iron wheels occupying the other half. The latter markings are identical with the past practice and are required to meet the present specifications for cast-iron car wheels. It does not seem practicable to have but one set of markings, for the reason that the 36-in. steel wheel after being turned down and before reaching the condemning limit will sometimes be of less diameter than a new 33-in. wheel, and, therefore, for use in mating steel wheels a continuous scale is necessary.

Attention is called to certain errors in the specifications for cast-iron wheels as they appear in the 1917 Proceedings, and certain paragraphs should be changed as follows:



Circumference Measure for Steel Tired and Cast Iron Wheels

Page 442.—*Material and Chill.*

Paragraph (*b*). It shall not exceed 1 in. in the middle of the tread nor be less than 3/8 in. in the throat for wheels having a maximum weight of 625 lb.

Paragraph (*c*). It shall not exceed 1 in. in the middle of the tread nor be less than 7/16 in. in the throat for wheels having a maximum weight of 700 lb.

Page 444.—*Marking.*

Paragraph 15, *Marking.* (The last sentence of this paragraph should read as follows:) Wheels conforming to the requirements and furnished under this specification shall have plainly formed on the outside plate, M. C. B. 1909 for wheels of nominal weight of 625 and 725 lb., and M. C. B. 1917 for wheels having a nominal weight of 700 and 850 lb.

Sufficient time has not elapsed since the adoption of the new recommended practice cast-iron car wheels of 700 lb. and 850 lb. weight to draw any conclusions based upon actual service, and the committee is, therefore, not in position at this time to recommend changing the shape of the plate or the weight of the 625 and 725 lb. wheels.

The report is signed by W. C. A. Henry, chairman, Pennsylvania; C. W. Van Buren, Canadian Pacific; J. A. Pilcher, N. & W.; O. C. Cromwell, B. & O.; J. M. Shackford, D. L. & W.; H. E. Smith, N. Y. C.; C. T. Ripley, A. T. & S. F.; and F. T. Slayton.

Action Taken.

The report was received with no discussion.

Other Business

F. W. Brazier (N. Y. C.) offered a resolution as follows: "Resolved, when empty cars of 60,000 lb. capacity or over are placed on shop or repair tracks for repairs they must not be returned to commercial service until they have been placed in condition to meet full M. C. B. inspection without exceptions, including United States Safety Appliances." This resolution was adopted.

At a meeting of the Executive Committee of the Master Car Builders' Association, I. S. Downing of the Big Four was made third vice-president, vice George W. Wildin, who has left railroad service. T. H. Goodnow, (Chicago & North Western) was appointed a member of the executive committee to fill the unexpired term of Mr. Downing. The personnel of the committees will remain unchanged for the coming year. The dues of association will remain the same as last year.

The secretary read a letter from R. W. Schulze, superintendent car department, St. Louis-San Francisco, asking that the association make some recommendation either for or against the application of switch chains on twin loads.

It was voted that the provision of the M. C. B. rules requiring defect cards for switch chains delivered with double loads should be eliminated.

It was voted to submit to letter ballot the matter of making metal spacing blocks behind the coupler horn mandatory.

M. M. Registration

Barnum, M. K., S. M. P., B. & O.
Brazier, F. W., S. R. S., N. Y. C.
Bunker, W. D., M. M., Colo. & Wyo.
Burton T. L., Consulting Air Brake Expert, N. Y. C.
Chambers, C. E., S. M. P., C. R. R. of N. J.
Connolly, J. J., S. M. D., D. S. S. & A.
Curry, H. M., S. M. P., N. P.
Dunham, W. E., Asst. to G. S. M. P. & C. D., C. & N. W.
Endsley, L. E., Prof., University of Pittsburgh.
Fogg, J. W.
Fuller, C. E., S. M. P., Union Pacific.
Giles, C. F., Supt. Mach., L. & N.
Kearney, Alex., Asst. S. M. P., N. & W.
Kinney, M. A., S. M. P., H. V.
Pratt, Edward W., A. S. M. P., C. & N. W.
Purcell, J., Asst. to V. P., A. T. & S. F.
Richmond, W. H., M. M., L. S. & I.
Ripley, Chas. T., G. M. I., A. T. & S. F.
Sample, W. H., Grand Trunk.
Sullivan, J. J., S. M., N. C. & St. L.
Thompson, W. O., S. R. S., N. Y. C.
Tollerton, W. J., G. M. S., C. R. I. & P.
Waring, F. M., Engineer of Tests, Penn. R. R.
Associate
Wright, O. C., A. E. M. P., Penn. Lines West.

M. C. B. Registration

Barnum, M. K., S. M. P., B. & O.
Bohan, W. J., M. E., Nor. Pac.
Boutet, H., Chf. Joint Inspector, Cincinnati, Ohio.
Brazier, F. W., S. R. S., N. Y. C.
Breaker, E. R., C. E., S. A. U. & G.
Burch, J. J., D. C. I., N. & W.
Burton, T. L., Consulting Air Brake Expert, N. Y. C.
Carson, G. E., D. M. C. B., N. Y. C.
Chambers, C. E., S. M. P., C. R. R. of N. J.
Coleman, James, S. C. D., Grand Trunk.
Collins, C. F., Aud., Paris & Mt. P.
Conerly, J. L., M. C. B., M. K. & T.
Connolly, J. J., S. M. P., D. S. F. & A.
Covert, M. F., A. M. C. B., S. R. T. Co.
Curry, H. M., M. S., No. Pac.
Downing, I. S., G. M. C. B., C. C. C. & St. L.
Dunham, W. E., Asst. to G. S. M. P. & C. D., C. & N. W.
Endsley, Prof. L. E., University of Pittsburgh.
Fritts, J. C., M. C. B., D. L. & W.
Fuller, C. E., S. M. P. & M., U. P.
Giles, C. F., Supt. Mach., L. & N.
Goodnow. T. H., A. S. C. D., C. & N. W.
Graff, F. M., Supt. Apprentices and Piece Work, Erie R. R.
Hacking, E., Grand Trunk Pacific.
Halbert, M. W., Chf. Interch. Insp., East St. Louis.
Hall, E. H., G. C. I., C. G. W.
Harvey, H. H., G. C. F., C. B. & Q.
Hennessey, J. J., M. C. B., C. M. & St. P.
Hogarth, Wm., Cudahy R. & T. Lines.
Jansen, E. W., Elect. Eng., I. C. R. R.
Kearney, A. A., S. M. P., N. & W.
Kinney, M. A., S. M. P., H. V.
Kinter, D. H., G. F. C. D., Mong. R. R.
Kleine, R. L., Chief Car Insp., P. R. R.
LaMar, A., M. M., Penn. Lines.
Laughlin, George F., S. C. D., Armour C. L.
Lentz, John S., M. C., B. L. V.
Lynn, Samuel, M. C. B., P. & L. E.
Mather, A. C., Pres., Mather S. C. Co.
McGary, Alex, S. C. T., N. Y. C.
McMunn W. R., G. C. I., N. Y. C.
Mehan, J. E., A. M. C. B., C. M. & St. P.
Milton, J. H., S. C. D., C. R. I. & P.
Neary, J. S., M. C. B., C. R. & L.
Osman, H. L., S. C. D., Morris & Co., R. L.
Pratt, E. W., Asst. S. M. P., C. & N. W.
Purcell, John, Ass't to Vice Pres., A. T. & S. F.
Rasbridge, R. B., S. C. D., Phila. & Reading.
Robertson, E. J., S. C. D., M. St. P. & S. S. M.
Robider, W. J., M. C. B., Cent. of Ga.
Richmond, W. H., M. M., L. S. & I.
Ripley, C. T., G. M. I., A. T. & S. F.
Schultz, F. C., C. I. I., Chicago.
Schulze, R. W., S. C. D., St. L.-S. F.
Shearman, C. S., Chgo., J. C. T.
Sloan, J. R., E. E. C. L., Penn. R. R.
Smith, A. E., A. M. C. B., Union T. L. Co.
Stoll, W. J., Chf. Interch. Inspector, Toledo, Ohio.
Sullivan, J. J., S. M., N. C. & St. L.
Swanson, Chas., A. S. C. S., A. T. & S. F.
Thompson, W. O., S. R. S., N. Y. C.
Tollerton, W. J., G. M. S., C. R. I. & P.
Van Buren C. W., G. M. C. B., Can. Pac.
Waring, F. M., Eng. Tests, Penn. R. R.
Wright, O. C., A. E. M. P., Penn. Lines West.

Wm. Schlafge
President, M. M. Association

F. H. Clark
First Vice-President, M. M. Association

Master Mechanics' Association Proceedings

Includes a Timely Discussion on the Conservation of Fuel on Locomotives and in Power Plants

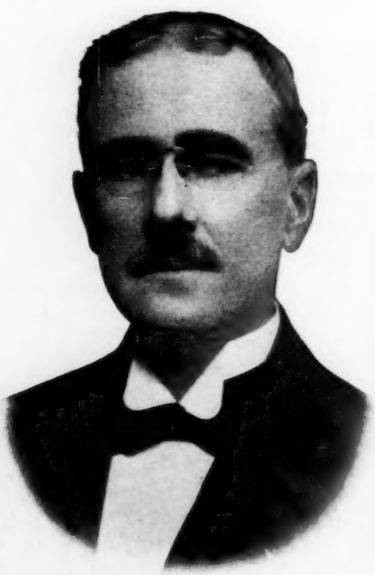
THE REPORTS of the Master Mechanics' Association were presented in conjunction with those of the Master Car Builders' Association at the joint meeting of the executive committees and representative members of the two associations at Chicago, June 19 and 20. In the absence of President Schlafge and Vice-President Clark, W. J. Tollerton, second vice-president of the association, officiated.

Mr. Schlafge Resigns

Mr. Schlafge in the following letter to the association tendered his resignation:

"In view of the decision to continue the present officers of the Association for the period of the war, I feel obliged to resign the office of president, and respectfully request that it be accepted as of June 19, 1918.

W. J. Tollerton
Second Vice-Pres. M. M. Assn.



C. F. Giles
Third Vice-President, M. M. Assn.

Angus Sinclair,
Treasurer, M. M. Association

"This action is taken with the deepest regret and reluctance but personal and official reasons, the weight of which I am entitled to judge, commend this course and I am committed to it irrevocably.

"May I be permitted to thank the members of the Association for conferring upon me the honorable trust that I now return to them and, in a more intimate sense, to express my gratitude as well as my thanks for the splendid support that I have received from all of the officers and members in the past two years. This chapter of my life will stand in undimmed letters to the end and that my interest in the affairs of the Association shall never abate."

Mr. Chambers: I am sure we all regret to see the stand Mr. Schlafge has taken. The executive committee, or joint executive committee, owing to many changes that were taking place from time to time and the difference in handling affairs that have come up, have deemed it wisest to continue with the present officers and make as few changes as possible until things assume a more quieted condition.

In the absence of Mr. Schlafge, Mr. Tollerton read his address to the association.

President Schlafge's Address

In this passion time of the world, in this greatest of all crises, not only individuals, but every association of individuals and every agency of human thought and action, especially those intimately related to the vital necessities of the nation's life must pass through a course of searching self-inquiry to determine to what extent the individual, or the association, or the agency is responsive to the full duty that rests upon him or it. In harmony with this thought, it is pertinent to recall that the test of the capacity of any individual or of any organization is his or its reaction to supreme emergencies. This association is an organization purporting to promote the interests of rail commerce in respect, primarily, of mechanical operation and the problems thereto related arising in the conduct of that vast enterprise.

The test then is—"Has this association, with exactly 50 years of experience behind it, so conducted its affairs; has it so impressed itself upon the thought of the railway world; has it so utilized its opportunities that it has in fact achieved the leadership that reasonably and logically could have been expected, so that in the supreme emergency of the nation's need, the director general of the national railways could turn to it as a perfectly organized and efficient instrumentality of railroad work and find in its proceedings solutions of many of the problems that he had to solve, and an active, smoothly running agency to put into effect the conclusions of its experience and to give constructive advice?" Did it so shape its course to render assistance to the end, in sight for many years, of a thorough co-ordination of the transportation business of the country in the interest of its people?

Candor compels the admission that while the association has justified its existence, it has not taken the high place to which it might have aspired. It is only just to say, however, that the limitations upon its proper expansion and development were largely beyond its control because of the general failure of railroad interests to recognize the fundamental principle that the transportation business of a nation is a natural state monopoly and that, sooner or later, a progressive state will either dominate the control of its transportation lines or own them.

To far-seeing men, it has been clear for many years that even peace conditions demanded the nationalization, either under private control or public ownership, of all the transportation agencies of this country. It was, therefore, apparent that standardization of the instrumentalities of commerce, as well as of methods, was inevitable if the highest efficiency were to be attained and the nation be well served according to its constantly growing business expansion. This association practically failed to recognize the ineluctable trend of events so that when, as a necessary war measure, the National Railway Administration demanded a standard locomotive, the association had no standard to offer.

All the voluntary railway associations have failed, more or less, to do the good they might have done for the simple reason that, as units, or collectively, they had no authority to constrain the railroads to the standards they did prescribe. This brings us to the question of the future of the associations.

Both major mechanical associations have been continued by the director general of railroads as railway organizations to the support of which the carriers may contribute. It is obvious that, if the approval is to stand indefinitely, both associations must bring themselves into harmony with the demand that these, and all similar railway agencies, shall be fully co-ordinated under a plan that will insure the achievement of stated and definite ends.

Conceding that co-ordination does not necessarily imply consolidation, it seems, nevertheless, that the logic of the situation might justify an institution to be called, for example, the American Railway Mechanical Association, organized to effect definite and highly useful ends as a unit. The institution of a new organization to cover the field now occupied by two can be effected without impairing the usefulness of either; on the contrary, their usefulness would be increased.

I earnestly commend to the association the wisdom of complete responsiveness to the letter and spirit of the director general's desire that the work of all such organizations be brought into close co-ordination, clearing their conclusions through one central authoritative body which, it is submitted, should be the American Railway Association. There is a growing conviction in many quarters that sentiment is the chief obstacle in the way of consolidation and, however admirable sentiment may be in its proper place, it is scarcely entitled to any consideration here.

It is suggested that a plan can be worked out, using the American Railway Association as the clearing house, whereby the results of all railway experience can be crystallized into settled practice and whereby the sum of knowledge may be increased and an organization perfected meriting at least a quasi public footing, that will be able and qualified to render valuable constructive service to the nation in time of peace as well as war.

Let me urge with equal earnestness the necessity of accepting and in every way encouraging the principle of the standardization of locomotives. There is little merit in the argument that standardization implies the end of improvement and progress. It would and ought to stop ill-advised and ill-considered innovation. By accepting the principle of standardization, and applying it to details of construction, a start will have been made that will rapidly reduce the ranks of those real obstructionists who are always on the job to cover every sign post on the road to progress with the legend "It can't be done."

With the authority of the government back of this proposition and crediting its proponents with a full appreciation of the value, not to say dire necessity, of locomotive efficiency, may we not safely dismiss all fears that evolution will die a violent death or that any substantial discouragement will be given to American enterprise to continue to apply its genius to keep the development of the locomotive abreast of the improvements that America shall make in all other directions. Also, it should be kept in mind that whatever the ultimate fate of the railroads may be, all signs indicate that they will be operated in the future as a national system and the efficiency of the whole operation rather than of a given portion of it will be the test.

It is quite generally urged that the present is inopportune to take such a radical step on account of the delay it will cause in deliveries. The force of this objection is dissipated

by the reflection that the duration of the war is problematical and that the present is the very latest time to take essential steps to guard the future. Standardization of ships and submarine chasers has justified itself—Why not locomotives?

The association has done much valuable work through its various standing and special committees. Many of the more important committees covering assignments of live subjects such as Fuel Economy and the related subjects of Mechanical Stokers and Powdered Fuel and Superheater Locomotives and Train Resistance Tonnage Rating, as well as the essential committees on Standards and Recommended Practice will be asked, doubtless, to collaborate with agencies created by the National Railway Administration.

All endeavors within the scope of the association's activities are indissolubly joined to the dominant issue of the national defense and it cannot be stated too often that the yard stick by which effort was measured in times of peace is utterly inadequate for application to the quality and quantity of endeavors that America now expects. A whole-hearted responsiveness to the plans and policies of the National leadership is the duty of every citizen and if more may be expected of any class than of another, it surely may be expected from those like ourselves who are actually in highly essential government service.

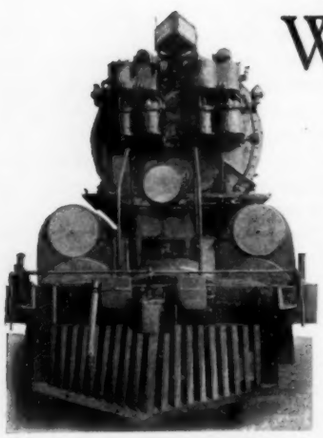
We stand here today in the place of that small group of forehanded men who a half century ago conceived and organized this association. Through all the years that have passed since then, it has held true to its original purposes and ideals. If it has failed in any respect to achieve the commanding position that it might have held, it must be granted that from its pioneer days it has been an active constructive force in its own field. Our faces must now turn hopefully to the future and, with the high inspiration of this stirring age to guide and encourage us, resolutely "carry on" and make up the lost opportunities of the past days.

Report of Secretary

The secretary reported the following membership: Active members, 902; representative members, 98; associate members, 17; honorary members, 45; and a total membership of 1,062. The total receipts during the two years ending June 18, 1918, were $16,308.56; disbursements, $12,809.35, leaving a cash balance of $3,499.21.

The treasurer reported a back balance of $2,115.50.

Report of Committee on Fuel Economy and Smoke Prevention



Front End of Norfolk & Western Mallet

We are here, not in our former capacities as the officers of individual railroads, but as officers of the government, responsible no longer to private corporations for efficient performance of duty, but instead to the United States Railroad Administration and in a larger sense to the public, whose servants we are. The committee considers that it should first point out the added duties and obligations which the new conditions have imposed upon us, with the hope that we may stimulate the sympathetic co-operation of every man in the mechanical department who is responsible for the use of fuel.

Never before in the history of the nation has there been a time when the fuel supply was generally inadequate to the demand, and never before was it so essential that our industries should be maintained at their maximum rate of production. It is realized now that upon the United States rests the hope of all the free people of the world, and it is not too much to say that the realization of this hope depends in no small degree upon the effective distribution and use of the available fuel supply.

According to the official figures in 1917 the railroads consumed 158,000,000 tons of coal. Estimates of the Fuel Administration indicate that the consumption in 1918 will aggregate 166,000,000 tons, an increase of seven per cent over last year. It is believed that this entire estimated increase can be avoided and a substantial saving effected over last year if the earnest co-operation of every railroad employee can be enlisted in the application of individual economies.

A few days ago the United States Fuel Administration in an official statement said that "A saving of 60,000,000 tons of coal was the one possible avenue of escape from national disaster. The necessities of war must be supplied. The coal deficit must inevitably come out of the necessary fuel for non-war industries. These industries employ millions of our population and furnish the backbone of our national wealth. Factories will shut down and men be out of work in proportion to the coal deficit. Every ton of coal saved will keep 50 workmen from idleness and permit additional creation of several hundred dollars of national wealth.

Of the 60,000,000 tons of coal that the Fuel Administration states it is necessary to save, a million and a quarter tons per month could be saved by simple methods of economy that any man using fuel on a railroad could at once apply, without a minute's delay for additional appliances or personal instruction. These men have only to be impressed with the importance of the subject to make this potential saving a practical reality and the committee believes that every road foreman, supervisor, traveling engineer and fireman should immediately be acquainted with the situation so that its importance may be understood by every engine crew in the country.

But this probable shortage in the supply is not the only factor that demands our consideration. The fact is, that in the opinion of the Fuel Administration it is physically impossible to transport all the coal needed so that it may fairly be concluded that the difficulty is mainly one of transportation. This means that for every pound of coal saved, a pound of another needed commodity may be transported and in the same proportion may the present traffic situation be relieved and subsequent congestion avoided.

A saving of 10 per cent in the coal consumption on American railroads means a reduction in demand of 332,000 cars, which is the approximate equivalent of 8,300 trains per annum, representing a movement during the period of greatest congestion in the winter months of more than eight hundred trains per month. This is not all that the suggested economy could accomplish. If 10 per cent saving could be immediately effected by December 1, the reserve supplies could be increased by fully six million tons, thereby further avoiding

a repetition of the congestion and traffic interruption of last winter.

In its first report the committee provoked some discussion because of its comments in respect to the purchase of coal to specifications naming a definite standard of quality. The necessity for utilizing all the coal in the ground was then emphasized and to this principle there can be no dissent. In the past three years, however, the increasing demand for coal has unquestionably resulted in a deterioration in the average quality, while in the face of actual shortage, industrial plants have accepted a grade of fuel undeniably inferior to previous averages. This has resulted in correspondingly reducing the quality furnished the railroads, the claim not infrequently being made that coal accepted by private consumers should satisfactorily meet the requirements for locomotive purposes—an argument ignoring, not only the difference in combustion conditions, but the economic disadvantage resulting from the shipment of slate, bone, rock and other impurities familiar particularly to users of bituminous coal. These impurities reduce the available units of transportation, increase the cost of labor per ton of combustible transported, unloaded and utilized, reduce the efficiency of power plants, increase the necessity for excess plant capacity, not infrequently actually reduce plant output and always impair locomotive performance both directly by reducing operating efficiency and indirectly through the consequent increase in the cost of repairs.

For these considerations, a reasonable improvement should now be demanded in the quality of all coal loaded for railroad use. It would not be unreasonable to require the prewar competitive standard.

The committee has heretofore chiefly considered the elements of fuel economy in their direct application, believing the scope of its work did not properly include many of the indirect factors that exert no inconsiderable influence upon railroad fuel consumption. But the critical situation portrayed in the official announcements of the Fuel Administration have suggested that brief reference should be made to some of these factors in order that emphasis may be placed upon the relation of all mechanical department employees to the problem of fuel economy and conservation.

There is not an element of locomotive maintenance that does not in some degree affect fuel consumption. Moreover, there are features of our maintenance that are intimately related to the coal consumption so that the question is one which should have large general interest to all employees of the mechanical department.

In order that the matter may be brought to the attention of those concerned briefly and comprehensively, a tabulation has been made indicating those details most affecting fuel economy in a properly designed locomotive. As far as any relative weight may be attached to the influence of these parts in fuel consumption, they have been arranged in what appears to be the order of importance, considered in relation to the maximum general effect.

LOCOMOTIVE DETAILS MOST AFFECTING FUEL CONSUMPTION

BOILER	ENGINE
Leaks:	Leaks:
Flues	Cylinder packing
Superheater	Valve packing
Mud ring	Cylinder heads
Firebox	Cylinder cocks
Shell	Steam chests and covers
Front end	Improper Adjustment:
Flues	Steam valves
Brick arch	Shoes and wedges
AIR SYSTEM	Safety valves
Air pump cylinder packing	Worn or Defective Parts Not Producing Leaks:
Air pump rod packing	Grate bars
Air pump governor relief port	Tires
Hose	Rods
Hose Couplings	

One of the most frequent causes of poor steaming locomotives is a leak in the boiler front door or frame, which is frequently compensated for by a reduction in the area of the exhaust nozzle, thereby placing a double burden upon the boiler and the coal supply further back. Every report of a poor steaming locomotive now requires immediate and special attention. We should so organize and instruct our forces as to insure prompt investigation and the application of the proper remedy in every instance.

In addition to the physical condition of the locomotives and their efficient operation, there are a number of particulars in which the motive power department may prove the effective agency for fuel conservation and to those brief references may profitably be made. The subjects may be grouped under two headings, those relating to the locomotive and those to engine house conditions.

Probably there is no single source of immediate and absolute waste as great as the ash pit. Every pound of unconsumed combustible that finds its way to the ash pit is a direct loss and the total aggregates huge proportions. It is impossible to eliminate this waste entirely but it can be minimized by proper firing methods so that the locomotive will reach the pit with a light fire, by dumping the engines as soon as possible after arrival at the ash pit so that the use of green coal may be avoided, and by prompt movement from the pit to the engine house.

Another prolific source of ash pit waste is caused by defective crane buckets and careless crane operation. Coal is lost through the buckets into the ash pit. There are frequent instances where the boiler washing program is not transmitted to the engine despatcher so that locomotives are dumped and fired up again before it is decided that they are to be washed, thus necessitating a second trip to the ash pit. It is safe to estimate that with a modern locomotive a loss of not less than four tons of coal is involved in this proceeding. Cars unloaded with a clam shell bucket are frequently re-consigned to the mines with coal in the hopper amounting to a ton or more. Our transportation necessities now demand that empty supply coal equipment be examined by the coal pocket foreman and every pound removed before the cars are re-consigned.

Two other factors require mention; one is unnecessary movement of engines and the other excessive use of air pump.

There are innumerable particulars in which engine house auxiliaries may increase the fuel cost. Relatively, the coal consumption is small compared to that of locomotives but the necessity for economy should lead us to investigate every avenue of waste.

The Fuel Administration is about to inaugurate a campaign for power plant fuel economy and is even considering the desirability of authorizing the distribution of coal to power plants on the basis of their relative efficiency. Railroad officers have given little attention to this phase of the subject but it now requires immediate and special consideration. Probably the most practical results could be obtained through special reports covering the essential factors in the use of fuel for all purposes, other than locomotives, handled through the engineering departments that are a part of most railroad mechanical organizations.

The sources of greatest waste about shops and roundhouses, are usually heating equipment or the lack of it. It is certain that during the coming winter no division of the Railroad Administration can justify its position as an advocate of fuel economy if no attempt is made to eliminate the coal basket and open coal fire usually observed at ash pits and water cranes. In all such places an inexpensive form of enclosed sheet steel stove should be substituted.

The heating equipment for engine houses, shop buildings and offices is frequently installed without reference to the usual principles governing the amount of radiation required, with the result that many buildings, particularly the smaller ones are greatly overheated. Under the existing conditions, no office should be heated to exceed 68 deg. F. and a temperature of 60 deg. F. would be entirely suitable for most buildings where clerical labor is not required. All radiators

producing temperatures in excess of the actual requirements should promptly be eliminated.

Another common source of heat loss is found in steam pipes installed under ground, the course of which is frequently indicated by melting snow in the winter months. Exposed piping is often left uncovered. Effective means should be taken to insulate all such piping and suitable traps should be installed and maintained on all radiating systems.

There is one other problem relating to fuel conservation which is of great importance and although it may not involve any direct responsibility on the part of the mechanical department, it concerns the railroad organization as a whole and for that reason deserves attention at this time. This is the storage of coal, which will undoubtedly be required to a greater extent than heretofore not only because it permits the accumulation of large reserve supplies against extraordinary demands, but because it accomplishes a stabilization of the entire fuel supply situation.

In the past there have been huge losses because of the spontaneous combustion of stored coal, particularly bituminous, and this has not only resulted in loss of fuel, but has affected subsequent locomotive efficiency in some degree and made labor demands upon our organization at a time when labor could have been more advantageously employed elsewhere. The prevention of spontaneous combustion has received much study by various investigators, but the latest and most comprehensive treatment of the subject appears in the University of Illinois bulletin No. 6 on "The Storage of Bituminous Coal," by H. H. Stouk, Professor Mining Engineering.

The committee has selected from this publication certain conclusions which have been summarized to cover the conditions peculiar to the methods at present in use for the storage of coal by railroads.

Instructions for the Storage of Bituminous Coal.

1. The risk of spontaneous combustion in stored bituminous coal increases with the percentage of slack, consequently as far as practicable only lump coal should be stored and this should be as free from dust and fine coal as possible. This consideration suggests the selection of the less friable coal for storage purposes.

2. The risk of fire from the storage of fine coal or slack may be minimized by the exclusion of air from the interior which may be accomplished

(a) by a closely sealed wall built around the pile or

(b) by close packing of the fine coal.

3. It is advisable that coal for storage purposes be as dry as possible. It should not be dampened when or after it is placed in storage.

4. Where a choice is possible, coal having low sulphur content should be shipped for storage purposes.

5. The risk of spontaneous combustion is minimized by so packing that air cannot enter the pile.

6. The segregation of fine and lump coal in the same pile should be avoided.

7. Where space permits coal should be stored in low piles, divided by alley-ways.

8. The different varieties should not be mixed and stored in the same pile.

Storage appliances and arrangements should be so designed as to permit the coal to be quickly removed and large piles should not be made when there is no provision for loading quickly.

In storing coal, care should be exercised to remove pieces of wood, greasy waste or other easily combustible material.

All storage piles should be regularly inspected and the temperature recorded. If the temperature reaches 150 deg. F., the pile should be watched carefully and if it rises to 175 or 180 deg. F. the coal should be removed as promptly as possible. The temperature should be taken with a thermometer at various places in the storage pile and at varying depths.

Where stored coal is under the jurisdiction of the mechanical department, it is recommended that these instructions be adopted as far as practicable and where the responsibility rests with the transportation department, that the subject be brought to the attention of the proper officer.

Heretofore we have approached the problem of fuel economy with a view to its effect upon operating expenses. Now we are obliged by force of circumstances to effect economy in order to conserve the available supply, and since as the director general says "The government now being in control of the railroads, the officers and employees of the various companies are no longer serving private interests. All now serve the government and the public interests only," we have a new obligation and a new duty and must grasp the spirit of the new era. Co-operation is necessary—individual effort indispensable.

The report is signed by: Wm. Schlafge, chairman, Erie; W. H. Flynn, Mich. Central; D. M. Perine, Penna. R. R.; Robert Quayle, C. & N. W.; D. J. Redding, P. & L., E.; W. J. Tollerton, C. R. I. & P., and F. H. Clark, B. & O.

Discussion

W. J. Bohan (N. P.): We hear a great deal of statistics about how much coal we are using and the places where it is wasted but no specific recommendation as to how to save it. Have any of the representatives any specific solution of the problem of conserving the coal, not only in locomotives but generally? The firemen and men handling the plants in shops can do a great deal to save coal if they had some specific rules to follow.

W. J. Tollerton: Few railroads have given the attention to stationary plants which they merit. The general practice, if a small terminal is to be established, is to pick out a discarded locomotive boiler for a heating plant—the most extravagant thing that could be put in. Our road some years ago, in common with a great many other railroads, established fuel supervising departments, not only for locomotives, but to supervise the fuel used in stationary plants. We have a supervisor of stationary plants, whose duty is not only to see that there is an adequate supply of steam for the work intended to be done at the shop or round house, but to follow the use of that steam from the time it is generated in the boiler until it is used up. He also has supervision over all the piping. If there are steam engines in the plant the valve motion is gone over, the air compressors are kept in shape and the exhaust steam is used for heating. If the boiler is of old design and uneconomical, recommendations are made to discard it and put in a more efficient boiler plant. The stack, the draft, and similar features, not only of locomotives but of stationary plants are of the utmost importance. We have a trained engineer who studies all these problems and makes his recommendations.

E. G. Gross (C. of Ga.): Statistics and the conclusions which are drawn from them, are the very things we need to correct our practice. The report is replete with positive suggestions. Nearly everything that is specified about the locomotive on the road will apply to the stationary power plants.

W. J. Bohan: I would like to ask Mr. Tollerton if, on his road, the power plant supervisor has absolute control of the power plant?

W. J. Tollerton: The supervisor of the stationary plants, in common with the supervisor of locomotive fuel, reports to the general mechanical superintendent, and the recommendation for any change or alteration or improvement in the stationary plant is made by the mechanical department; the actual execution of the work is by the superintendent's force. The specifications for all standard boilers as well as loco-

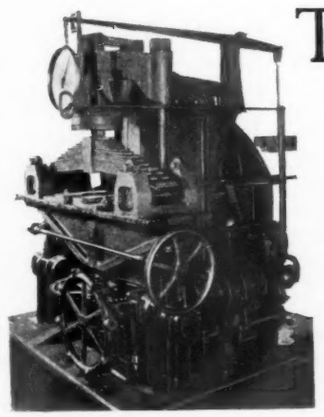
motive boilers are made by the mechanical department. When they are on the ground, however, the installation is made by the superintendent's force, under the supervision of the mechanical department.

W. J. Bohan: How is the coal handled? One plant may take run of mine coal, another No. 4, and another No. 5, and so on. Does the power plant supervisor have control not only of the design but also of the operation of the power plants? The average railroad lets everyone, from division superintendent to the supervisor of bridges and buildings, run the boiler plants.

W. J. Tollerton: The superintendent handles the distribution of fuel on his division; he supplies the coal chutes with fuel and supplies the stationary plants with fuel. But if he has been told that a certain stationary plant on his division can use slack coal successfully, it must be provided with slack coal. Another stationary plant on the same division may be assigned run of mine coal. At the end of the month if for any cause he has furnished the slack coal plant with the run of mine coal he is notified of the fact from our office. He is asked by his general manager why he did not provide the necessary fuel, and is called upon to make the necessary explanation.

E. W. Pratt (C. & N. W.): Only last week the committee of arrangements of the Fuel Association held a very important meeting here in Chicago. Mr. McAuliffe, who is now manager of the Fuel Conservation Section of the Railroad Administration, is a member of that committee. The addresses delivered at the convention of the association will be sent under personal cover in government envelopes to every railroad company, every engineer and fireman and every shop man in the motive power department. To the first two classes, there will be included an instruction book, which has been devised by the Fuel Conservation Section and some other information of an official nature. Following that, I understand the railroads of the country will be divided into fuel districts, practically corresponding with the regional districts.

Specifications and Tests for Materials



Spring Testing Machine

THE COMMITTEE on Specifications and Tests for Materials submitted its report covering the different subjects which were reviewed during the past year, including also its report for the previous year (1916-17), with certain modifications, and made its recommendations as shown under the respective exhibits.

Exhibit A.—Specifications for Staybolt Iron

RECOMMENDED PRACTICE

1. **Scope.**—These specifications cover all staybolt iron.

I. MANUFACTURE

2. **Process.**—The iron shall be rolled from a bloom, slabpile or boxpile, made wholly from reworked puddled pig iron, or reworked knobbed charcoal iron. The puddle mixture and the component parts of the bloom, slabpile or boxpile shall be free from any admixture of iron scrap or steel.

3. **Definition of Terms.**—(a) Bloom. A bloom is a solid mass of iron that has been hammered into a convenient size for rolling.

(b) Slabpile.—A slabpile is a pile built up wholly from flat bars of iron, of the full length of the pile.

(c) Boxpile.—A boxpile is a pile, the sides, top and bottom of which are formed by four flat bars and the interior of which consists of a number of small bars the full length of the pile.

(d) Iron Scrap.—This term applies only to foreign or bought scrap and does not include local mill products free from foreign or bought scrap.

II. CHEMICAL PROPERTIES AND TESTS

4. **Chemical Composition.**—At the option of the purchaser and when so specified, chemical analysis shall be made and drillings taken from tension test specimens which shall conform to the following requirements as to chemical composition:

Phosphorus	not over 0.150 per cent
Manganese	not over 0.10 per cent

III. PHYSICAL PROPERTIES AND TESTS

5. **Tension Tests.**—(a) The iron shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47,000-52,000
Yield point, min. per cent of tensile strength	60
Elongation in 8 in., min. per cent	30
Reduction of area, min. per cent	48

(b) The yield point shall be determined by the drop of the beam of the testing machine. The speed of the crosshead of the machine shall not exceed ¾ in. per minute. After passing the yield point the testing speed shall be between 3 and 4 in. per minute. The distance between the grips shall not be less than 10 nor more than 11 in.

(c) In no case shall the variation in tensile strength between the maximum and minimum figures, for one offering of iron under these specifications, be more than 3000 lb.

6. **Bend Tests.**—(a) Cold-bend Test. The test specimen shall bend cold through 180 deg. flat on itself in both directions without fracture on the outside of the bent portion.

(b) Nick-bend Test.—The test specimen, when nicked 25 per cent around with a tool having a 60 deg. cutting edge, to a depth of not less than 8 nor more than 16 per cent of the diameter of the specimen, and broken, shall show a clean fiber free from crystallization.

(c) Bend tests shall be made by pressure.

7. **Etch Test.**—The cross-section of the test specimen shall be ground or polished and etched for a sufficient period to develop the structure. This test shall show the material to be free from steel.

8. **Test Specimens.**—All test specimens shall be of the full section of material as rolled.

9. **Number of Tests.**—(a) Bars of one size shall be sorted into lots of 100 each. Two bars shall be selected at random from each lot or fraction thereof and tested as specified in Sections 5 and 6, except that only one of these bars shall be tested as specified in Section 7.

(b) If any test specimen from either of the bars originally selected to represent a lot of material contains surface defects not visible before testing, but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, a retest will be allowed.

IV. PERMISSIBLE VARIATIONS IN GAGE

10. **Permissible Variations.**—The bars shall be truly round within 0.01 in. and shall not vary more than 0.005 in. above nor more than 0.01 in. below the specified size.

V. FINISH.

11. **Finish.**—The bars shall be smoothly rolled and free from slivers, depressions, seams, crop ends and evidence of being burned.

VI. MARKING.

12. **Marking.**—The bars shall be stamped or marked as designated by the purchaser.

VII. INSPECTION AND REJECTION.

14. **Rejection.**—(a) Material represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Individual bars which will not take a clean, sharp thread with dies in fair condition or which, subsequent to the above tests at the mills or elsewhere and their acceptance, develop defects in forging or machining will be rejected and shall be replaced by the manufacturer.

Exhibit B.—Specifications for Cast-Iron Cylinders and Cylinder Parts for Locomotives

1. The following revision to supersede the present Specifications for Locomotive Cylinder Castings, Cylinder Bushings, Cylinder Heads, Steam Chests, Valve Bushings, Packing Rings and Superheater Castings.

1. **Scope.**—These specifications cover cast iron for locomotive cylinders, piston valve bushings, piston valve packing rings, piston valve bull rings, cylinder bushings, piston packing rings and piston head or bull rings.

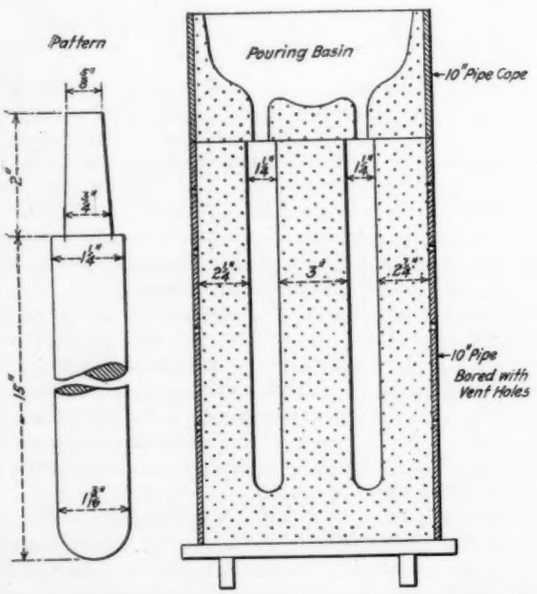


Fig. 1—Mold for Arbitration Test Bar

I. MANUFACTURE.

2. **Process.**—All castings shall be made from good quality, close-grained gray iron. Cylinders shall be cast in dry sand molds.

II. CHEMICAL PROPERTIES AND TESTS.

3. **Chemcal Composition.**—The iron shall conform to the following requirements as to chemical composition:

Phosphorus	not over 0.70 per cent
Sulphur	not over 0.12 per cent

4. **Ladle Analysis.**—An analysis shall be made by the manufacturer from a test bar taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Section 3.

5. **Check Analysis.**—A check analysis of drillings taken from the fractured end of the transverse test bars may be made by the purchaser, and shall conform to the requirements specified in Section 3.

III. PHYSICAL PROPERTIES AND TESTS.

6. **Transverse Test.**—(a) The arbitration test bar, as described in Section 8, shall be placed horizontally upon supports 12 in. apart center to center, and when tested under a centrally applied load, the transverse strength shall not be less than 3200 lb. for castings 5/8 in. or less in thickness, nor less than 3500 lb. for castings over 5/8 in. in thickness; and

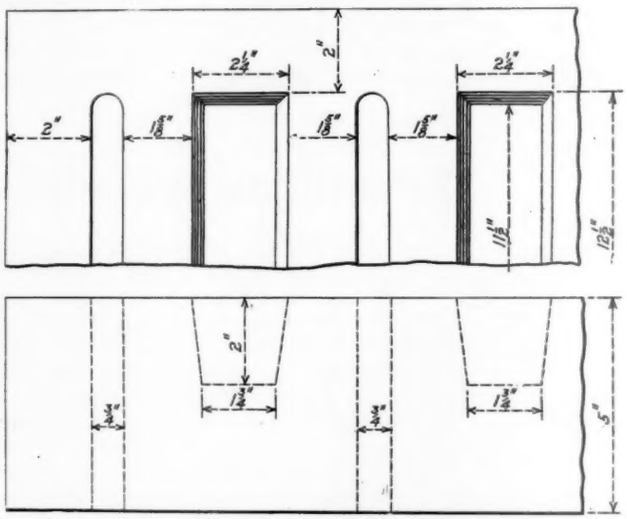


Fig. 2—Mold for Chill Test Specimen

the deflection, for either thickness of material, shall not be less than 0.09 in.

(b) If the transverse strength or the deflection of the first test bar does not conform to the requirements specified in paragraph (a), a test may be made on the second bar, as provided for in Section 8, which shall conform to the requirements specified.

(c) The application of the load, for a deflection of 0.10 in., shall be within a period of from 20 to 40 seconds.

7. **Chill Test.**—A sample of the molten iron shall be chilled in a cast-iron mold. The sample shall be allowed to cool in the mold until it is a dark red or almost black, when it may be knocked out and quenched in water. The sample, when broken, shall show a close-grained gray iron, with a well-defined border of white iron at the bottom of the fracture. The depth of the white iron shall not be less than 1/16 in. for castings 5/8 in. or less in thickness, nor less than 1/8 in. for castings over 5/8 in. in thickness.

8. **Test Specimens.**—Two arbitration test bars and one chill test bar shall be poured from each melt of iron, in accordance with the form and dimensions as shown in Figs. 1 and 2, provided that the diameter of the arbitration test bar shall not vary more than 0.02 in. above or below the specified size.

9. **Number of Tests.**—One transverse test, except as specified in Section 6 (b), and one chill test shall be made to represent each melt.

IV. WORKMANSHIP.

10. **Workmanship.**—Castings shall be smooth, well cleaned, free from shrinkage cracks and other injurious defects. When castings are to be machined, sufficient allow-

ance shall be made on patterns, that the castings will finish to blue-print dimensions.

V. MARKING.

11. **Marking.**—When so specified, the manufacturer's name or identification mark, the date when cast, the purchaser's pattern number and such other marking as may be designated, shall be cast on each casting in raised letters and figures.

VI. INSPECTION AND REJECTION.

12. **Inspection.**—(a) The purchaser or his representative shall be given reasonable opportunity to enable him to witness the pouring of the castings and test specimens, as well as to be present when physical tests are made.

(b) In case the inspector is not present to witness the pouring of the castings and test specimens, the manufacturer shall make all tests required by the specifications and, upon request, shall furnish the purchaser with a copy of the results of his tests and shall hold the transverse test and the chill test specimens, subject to examination by the inspector.

(c) The purchaser may make the tests to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

(d) All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

13. **Rejection.**—(a) Castings represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Individual castings which, subsequent to the above tests and inspection at the foundry or elsewhere and their acceptance, show defects or imperfections will be rejected and shall be replaced by the manufacturer.

14. **Rehearing.**—Samples tested in accordance with the requirements of these specifications, which represent rejected material, will be held for 14 days from the date of test report. In case of dissatisfaction with the results of tests, the manufacturer may make claim for a rehearing within that time.

Exhibit C.—Specifications for Mild Steel Bars

(See Exhibit B in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit D.—Specifications for Tank and Underframe Rivet Steel and Rivets

(See Exhibit C in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit E.—Specifications for Locomotive Rivet Steel and Rivets

1. SEC. 6.—**Number of Samples for Chemical Analysis.** Omit the words "for Chemical Analysis" and also omit the words forming the last sentence of paragraph (a), "These samples shall be used for check analysis by the purchaser."

Exhibit F.—Specifications for Welded Pipe

(See Exhibit F in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit G.—Specifications for Steel Axles for Locomotive Tenders

1. Add a new Section 1, to read as follows, and re-number subsequent sections accordingly:

"1. **Scope.**—These specifications cover axles up to and including those 6½ in. in diameter at the center. Axles over 6½ in. in diameter at the center shall not be subject to the drop test, but may be purchased under the Standard Specifications for Annealed and Unannealed Carbon Steel Axles, Specifications for Quenched and Tempered Alloy Steel Forgings, or Specifications for Quenched and Tempered Carbon-steel Axles, Shafts and other Forgings for Locomotives and Cars."

2. SEC. 5. Omit the "Formula" and "Note" as shown under the present paragraph (b), and change the present Section 5 to read as follows:

"6. **Drop Test.**—(a) The test axle shall be so placed on supports 3 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture five blows from a tup of 2240 lb. falling from a height as specified, and the permanent set produced by the first blow shall not exceed that specified for axles of corresponding dimensions, as shown in the following table. The axle shall be turned through 180 deg. after the first and the third blows.

"(b) The permanent set is the difference between the distance from the straight-edge to the middle point of the axle measured before the first blow and the distance measured in the same manner after the blow. The straight-edge shall rest only on the collars or the ends of the axle.

"(c) The temperature of the axle, when tested, shall be between 40 and 120 deg. F."

3. **Table.**—Make the following changes:

Omit the words "Weight of Tup, 2240 lb. Supports 3 Ft. Apart."

Add to the table a column under "Size of Axle, In." with the heading "Length Over All, In.," and the dimensions "84¼, 86½, 88½, 90¾," for axles having journal dimensions 4¼ by 8, 5 by 9, 5½ by 10 and 6 by 11 in., respectively.

Under "Maximum Permanent Set, In.," change the values "6½" and "4½" to read "6¼" and "4¾," respectively.

4. Present Section 10. — **Permissible Variation.** Change the tolerance for excess length over all, from 3-32 in. to ⅛ in.

Exhibit H.—Specifications for Boiler and Firebox Steel for Locomotive Equipment

1. SEC. 3.—**Chemical Composition.** Omit from the requirements the copper content "not over 0.05 per cent" for firebox steel.

2. SEC. 13.—**Weight.** Change to read as follows:

"The overweight of each lot* in each shipment shall not exceed the amount given in the following table. One cu. in. of steel is assumed to weight 0.2833 lb."

(Substitute the following table for the present one, shown on page 551.)

PERMISSIBLE OVERWEIGHT OF PLATES ORDERED TO THICKNESS

PERMISSIBLE EXCESS IN AVERAGE WEIGHT PER SQUARE FOOT OF PLATES FOR WIDTHS GIVEN, EXPRESSED IN PERCENTAGES OF NOMINAL WEIGHT

Ordered gage, inches	Under 48 in.	48 to 60 in., excl.	60 to 72 in., excl.	72 to 84 in., excl.	84 to 96 in., excl.	96 to 108 in., excl.	108 to 120 in., excl.	120 to 132 in., excl.	132 in. or over
Under ¼	9	10	12	14	..	..	..	..	..
¼ to 5/16, excl.	8	9	10	12	..	..	..	..	..
5/16 to ⅜, excl.	7	8	9	10	12	..	..	..	..
⅜ to 7/16, excl.	6	7	8	9	10	12	..	..	..
7/16 to ½, excl.	5	6	7	8	9	10	12	14	17
½ to 9/16, excl.	4.5	5	6	7	8	9	10	12	15
9/16 to ⅝, excl.	4	4.5	5	6	7	8	9	10	13
⅝ to 11/16, excl.	3.5	4	4.5	5	6	7	8	9	11
11/16 to ¾, excl.	3	3.5	4	4.5	5	6	7	8	9
¾ to 1, excl.	2.5	3	3.5	4	4.5	5	6	7	8
1 or over	2.5	2.5	3	3.5	4	4.5	5	6	7

*The term "lot" applied to the above table means all of the plates of each group width and group thickness.

Exhibit I

1. Change the form and dimensions of Tension Test Specimens, Figs. 1, pages 560 (Specifications for Annealed

and Unannealed Carbon Steel Axles, Shafts and other Forgings for Locomotives), 577 (Specifications for Quenched and Tempered Alloy Steel Forgings), and 583 (Specifications for Quenched and Tempered Carbon Steel Axles, Shafts and other Forgings for Locomotives and Cars), to conform to the latest type of American Society for Testing Materials specimen.

Exhibit J.—Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and Other Forgings for Locomotives

1. SEC. 12.—**Retests.** Change paragraph (b) to read as follows:

"When annealed forgings are specified, if the fracture of any test specimen shows over 15 per cent crystalline a second test shall be made. If the fracture of the second specimen shows over 15 per cent crystalline, the forgings represented by the specimen shall be re-annealed. The fracture shall be considered crystalline if the crystals which it contains are so large that the cleavage planes or sides of these crystals are easily visible to the eye."

The report is signed by C. D. Young, chairman, Pennsylvania; J. R. Onderdonk, B. & O.; A. H. Fetters, Union Pacific; Frank Zeleny, C. B. & Q.; H. E. Smith, N. Y. C.; H. B. MacFarland, A. T. & S. F.; Prof. L. S. Randolph, Virginia Polytechnic Institute.

Action Taken

There was no discussion. The report was accepted and will be submitted to letter ballot.

Design and Maintenance of Locomotive Boilers

C. E. Fuller
Chairman

TWO YEARS AGO a report was presented offering basic ratios to be considered in locomotive-boiler design, covering also, in a general way, the use of autogenous welding in the maintenance of boilers, which this committee found was being utilized by many roads with very satisfactory results. Last year Circular E was issued, requesting data covering the subject of autogenous welding as applied to locomotive boilers. Replies were received from 36 roads, indicating the extent to which they are using these processes, and the committee now presents the results of the investigation.

Smoke Boxes

There is no doubt that the construction and renewal of smokeboxes is handled expeditiously and economically by the use of autogenous welding. For joining smokeboxes at the longitudinal seam, several roads use the oxy-acetylene torch, while an equal number prefer to electric weld this seam. The usual method followed is to tack the edges of the sheet together at intervals of about 8 in., with strips about 2 in. long, then complete the weld, thus providing for more uniform expansion of the sheet than if a through weld were made. Wherever welded seams have been used, the results have been satisfactory. The cost is approximately 60 per cent of a riveted seam.

Practically all of the roads reporting cut off old or damaged smokebox plates by oxy-acetylene. It appears to be the usual practice to weld in small plates, but for larger plates to use riveted joints. The reinforcing rings in smokeboxes are usually not disturbed, the weld being made ahead of the ring.

Flues

The practice of electric-welding flues, particularly superheater flues, is quite general. The flue is applied in the usual manner, after which the firebox ends are beaded and welded lightly around the bead. Where used, the results have been satisfactory, although some trouble has been experienced from leakage when locomotives are located at points which have no welding apparatus. Of the roads reporting, 42 per cent use the oxy-acetylene or electric process for filling up pit holes in flues.

From the reports it is evident that a broad field for the application of autogenous welding lies in the safe-ending of flues, or the welding in of a new section near the center for the purpose of lengthening them for re-application. The advantage which comes from not having to limit the length of safe ends, on account of the capacity of flue-welding machines, certainly offers an opportunity to reclaim material which would otherwise not be serviceable. Of the roads reporting, 20 per cent are using the autogenous welding process for safe-ending flues, with satisfactory results. Three of the reporting roads have welded a new section into the flues, and the results from this practice have also been satisfactory.

Of the roads reporting, 20 per cent practice cutting out for replacement the entire flat surface of the front flue sheet, without disturbing the flange or rivets. This method, however, has not been generally adopted, and it is usual to cut out the entire old sheet by the acetylene process, and to replace it with a new one. The practice of cutting out the section of the front flue sheet under the dry pipe, containing the flue holes, and replacing it by welding in a new section suitable for the application of superheater flues, has not met with wide favor, although the roads doing this report satisfactory and economical results. One road reports that by following this practice it can replace sheets at a cost of $28, as compared with $150 for entire new sheets riveted in place.

The majority of roads reporting do not apply back flue sheets by welding, but this is being satisfactorily accomplished on some few roads by either process. The use of oxy-acetylene or electric welding for repairing cracks in the knuckle of flue sheets is quite general and produces good results. There is, however, a wide variance in the methods of welding. Seventeen roads report that such cracks are welded on both sides, six weld on the water side only, while three weld on the fire side only. One road reports that it prefers to use electric welding from the water side, and oxy-acetylene from the fire side.

For repairing cracks in flue-sheet bridges, the usual practice is to remove the adjacent flues, cut the sheet, both sides, at about a 45 degree angle, and then fill in the space.

Staybolts

A number of roads are using oxy-acetylene torches for burning off the projecting ends of new staybolts before riveting them over. The results obtained have been, in most cases, satisfactory. To insure all bolts being cut off uniformly, one road uses a guide next to the nozzle.

Electric welding of cracks radiating from staybolt holes seems to be the most satisfactory. It is customary to remove

the staybolt, chamfer the hole for the purpose of eliminating the cracks, or, should the crack extend too far for this, to bevel both hole and crack to 90 degrees and fill the crack and hole up solid; the sheet is then drilled and tapped for the application of a new staybolt.

Fireboxes

There is no part of the boiler where the application of these processes of welding has been so uniformly successful or resulted in greater economy than for firebox application and repairs. Ranging in scope from putting in entire new fireboxes to building up around leaky mud-ring rivets, the manifold utility of autogenous welding seems to be limited only by the ingenuity of the operator.

Of the roads reporting, 25 per cent are using the electric process for welding in entire new fireboxes. The application of part or full firebox sheets and door sheets has been quite generally practiced. Door sleeves are renewed, part wrapper sheets and part back heads applied, and the application of patches reduced to a minimum by welding.

Where patches are required, the work is accomplished by welding, at about 60 per cent of the cost of riveted patches. The forms of patches used vary with individual roads. Some cut the sheet out with square edges, lay the patch over the hole in the sheet, with a lap around the outside of about ⅜ in., the patch being beveled on its edges, and build up over the bevel and onto the sheet. Another method is to flange the edges of the hole outwardly, lay the patch on the extending flange, with its beveled edge projecting outside the flange toward the sheet, and then join the beveled edge of the patch to the flange by building up a bead. Still another method followed on repairs to firebox sheets is to V out the sheet on the fire side, place a patch which has edges beveled in the opposite directions from the sheet into the opening, then fill up the 90-deg. opening. With this style of patch, an expansion knuckle parallel to the vertical center line of staybolts provides for stresses. The results are uniformly satisfactory. For filling up staybolt or rivet holes, both processes are largely used. Eight of the reporting roads weld exterior bosses, usually by the oxy-acetylene process, on the outside wrapper sheet, to give increased full threads for angular radial staybolts. Only two roads report having welded in arch tubes, while three weld firebrick arch studs to firebox side sheets successfully.

Three roads have reported cutting off firebox and wrapper sheets above mud rings to avoid disturbing mud-ring rivets, then welding new fireboxes at this point. This practice, as yet, has not been followed to any extent.

The welding of cracks is usually limited to those from 4 in. to 35 in. long, the latter being done only to keep the locomotive in service. Practically 8 in. is considered about as long a crack as it is desirable to weld for permanent repairs, most roads preferring not to exceed 4 in.

Mud Rings

For mud-ring repairs, either electric or oxy-acetylene welds are used, the former being preferred. The usual method followed is to cut out a piece of the side sheet, over the crack, in the mud ring, bevel the mud ring from the top, then fill up the opening, after which the sheet is patched. In cases where the mud ring is removed from the locomotive, some roads prefer to bevel from both sides and then weld. A large saving in the cost of repairs results from welding mud rings in place. Troublesome leaks in mud-ring corners are eliminated by building up the caulking edge.

General

Among the many other repairs made by these methods may be cited reducing worn washout-plug holes, reclaiming superheater units, building up worn places on stayed surfaces and welding up abandoned flue or plug holes.

The use of a carbon electrode or a metal electrode is primarily dependent on the size and strength of the weld desired. The carbon-electrode process should be used on work of considerable size, if maximum strength is not a limiting factor, and is very desirable for rapid cutting. When using the carbon electrode it is customary for the operator to heat around the weld, so that extensive contraction may be avoided.

The metal-electrode process, which is generally used in the various phases of boiler-maintenance work, has the advantage of confining the heat more closely, and is used for welds requiring strength and for small work. The current required has a much lower value than that used with the carbon-electrode process.

If the current is too high for the size of welding wire being used, it is found the metal oxidizes and the weld becomes hard and brittle. Representative practice appears to be about as follows:

⅛-in. wire	100-120 amperes
5/32-in. wire	115-135 amperes
¼-in. wire	130-150 amperes

The voltage at the panel should be from 70 to 75, reduced at the arc to about 20 to 30 volts. By following these limits, it has been found the metal flows in its most natural state, leaving the weld unoxidized and ductile.

As a general rule, it is desirable after starting a weld to complete it if possible before stopping, on account of the effect of the contraction of the sheet if work ceases. In some cases it will be found advisable to have two men work alternately in order to accomplish this. On account of the wide variance in the methods followed, and the costs reported, the committee does not feel that definite recommendations can be formulated, believing that local conditions so far govern these as to make such recommendations of little value.

While it is gratifying to consider how much has been accomplished in the use of the oxy-acetylene and electric processes for boiler maintenance, it is believed that the art is still in a formative and developmental state, and the future will see even greater progress, as the possibilities of economical application are exploited. It may not be amiss for this committee to sound a warning against too radical application. Stayed surfaces and appurtenances, which are not subject to direct radial pressure, offer a safe and attractive field for future experiments, and any work for the time being should be limited to these sections of the boiler.

The report was signed by C. E. Fuller, chairman, superintendent motive power, Union Pacific; A. W. Gibbs, chief mechanical engineer, Pennsylvania; D. R. MacBain, superintendent motive power, New York Central; M. K. Barnum, assistant to vice-president, Baltimore & Ohio; R. E. Smith, general superintendent motive power, Atlantic Coast Line; C. B. Young, mechanical engineer, Chicago, Burlington & Quincy, and J. Snowden Bell.

Discussion

E. W. Pratt (C. & N. W.): We are spending a great deal of money for new shell sheets that are merely pitted in the belly; personally I can not see any danger with the present state of the art in welding up a pit hole there.

C. E. Fuller (Union Pacific): The welding of a pair of courses is nothing new. It has been practiced by the locomotive builders for a great many years. The objection that the government bureau has had against its practice was the inability to determine the factor of safety of the welded sheet. There is no question but what a lot of pits in the shell can be taken care of with absolute safety as there is plenty of strength in the sheet, with the possible exception of the circumferential seam around the sheet.

C. E. Chambers (C. R. R. of N. J.): I think it would be perfectly safe if a maximum depth of pitting could be established.

Action Taken

The report was received and the committee was continued.

Revision of Standards and Recommended Practice

W. E. Dunham
Chairman

AFTER CONSIDERATION of the present Standards and Recommended Practices of the Association, together with the replies received to the circular of inquiry sent to members, the committee submits the following report:

Driving Wheel Centers

(STANDARD.) PAGES 529-530

1. A member suggests that the ⅛-in. retaining lip on the tire shown in connection with the details of driving wheel centers should be omitted. The committee concurs in the suggestion and the secretary will be instructed to correct the drawings.

Specifications for Steel Axles for Locomotive Tenders

(STANDARD.) PAGES 533-536

2. A member calls attention to the fact that inasmuch as axles for engine trucks are ordinarily tested under the drop from the same nominal center diameter as car axles, there should be a sheet of standard engine truck axles and a table for the drop tests made to correspond. The committee does not concur in the suggestion.

Journal Boxes, Bearings and Wedges

(STANDARD.) PAGES 536-537

3. *For Journals* 3¾ *by* 7 *in. Sheet M. M.* 4. A member calls attention to the fact that the arc recess is not shown on Sheet M. M. 4, although its omission for larger-sized wedges was adopted by letter ballot in 1916, and suggests that similar action is advisable for the 3¾ by 7 in. journal box in question. The committee does not concur in the suggestion.

4. *For Journals* 4¼ *by* 8 *in. Sheet M. M.* 6. A member calls attention to the arc recess being indicated in the wedge in the plan and cross-section views of the journal box, and suggests that they should be omitted. The committee notes the error, and the secretary will be instructed to correct the drawings.

5. *For Journals* 4¼ *by* 8 *in. Sheets M. M.* 6 *and* 7. A member calls attention to the over-all width of bearing, 4⅛ in., leaving an edge which is too thin after boring for a 5/16-in. lining metal, and suggests increasing this width to 4⅜ in. The committee concurs in the suggestion.

6. *For Journals* 5 *by* 9 *in. Sheet M. M.* 9. A member calls attention to the arc recess being indicated in the wedge in the cross-section view of the journal box, and suggests that it should be omitted.

The committee notes the error, and the secretary will be instructed to correct the drawings.

7. *For Journals* 5½ *by* 10 *in. Sheet M. M.* 12. A member suggests that the plan view of the journal box on Sheet M. M. 12 is misleading, as it is not clear whether the arc recess refers to the wedge or the brass. The committee does not concur in the opinion expressed.

8. *For Journals* 5½ *by* 10 *in. Sheets M. M.* 12 *and* 13. A member recommends increasing the over-all width of 5¼ in. to 5⅜ in., in order to allow for proper boring of the bearing, the 5¼ in. leaving an edge which is too thin after boring for 5/16-in. lining metal. The committee concurs in the suggestion.

Solid Wrought Carbon Steel Wheels

(RECOMMENDED PRACTICE.) PAGES 543-546. SHEETS M. M. H, I, J AND K

9. A member suggests that the drawings on Sheets H, I, J and K should show four 1¼-in. holes through the plate, located at suitable radii so as to assist in holding the wheel when turning up in a lathe. The committee does not concur in the suggestion.

10. A member suggests advancing these specifications to Standard. The committee concurs in the suggestion.

Minimum Thickness for Steel Tires

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

11. A member suggests advancing to Standard. The committee concurs in the suggestion.

Wheel Circumference Measure for Steel and Steel Tired Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

12. A member suggests advancing to Standard for steel, steel tired and cast wheels, and eliminating the circumference measure shown on Sheet M. M. 20. The committee concurs in the suggestion.

Rotundity Gage for Solid Steel Engine and Truck Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

13. A member suggests advancing to Standard. The committee concurs in the suggestion.

Plane Gage for Solid Steel Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

14. A member suggests advancing to Standard. The committee concurs in the suggestion.

Specifications for Air Brake Hose Gaskets

(RECOMMENDED PRACTICE.) PAGES 591-592

15. A member suggests that the title should read, "Gaskets for Air Brake Hose Couplings." The committee does not concur in the suggestion.

Specification for Chain

(RECOMMENDED PRACTICE.) PAGES 594-597

16. A member suggests that in Section IV, paragraph 8 (a), the word "injurious" be incorporated in the first line, and in paragraph 8 (b) the word "perceptible" be incorporated in the last line. The committee does not concur in the suggestion.

Safety Appliances

(STANDARD.) PAGES 635-640

17. A member suggests that any conference or other published rulings of the Interstate Commerce Commission, as regards Safety Appliances as far as they pertain to steam locomotives, be published as a part of the proceedings. The committee concurs in the suggestion.

Inspection and Testing of Locomotive Boilers

(STANDARD.) PAGES 640-648

18. A member suggests that the reference to the date of July 1, 1912, should be omitted in paragraph 37. The committee does not concur in the suggestion.

Rules and Instructions for Inspection and Testing of Steam Locomotives and Tenders

(STANDARD.) PAGES 648-663

19. A member suggests that with the weight of springs in use in spring buffers between engine and tender, the ¾-in. compression required in the last paragraph of Rule 22 is too much, and suggests that this be reduced to ½ in. The committee does not concur in the suggestion.

20. A member suggests that, inasmuch as we have had sufficient experience in autogenous welding to know that an autogenous weld can be made as solid as a fire weld, when welding up cracks, the second paragraph of Rule 28 be changed to admit of autogenous welding of cracks in rods. The committee does not concur in the suggestion.

21. A member suggests that the Rules 29 and 31, covering headlight requirements on road and yard engines, be superseded or modified by the latest instructions. The committee concurs in the suggestion, as covered by paragraph 24 of this report.

22. A member suggests that in the second paragraph of the Rule 52, in reference to the height between tender and locomotive decks, the words "when on straight and level track" should be added. The committee does not concur in the suggestion.

23. A member suggests that modifications of the original rules, when given by the Interstate Commerce Commission, should be embodied in the rule or attached as an explanatory note. The committee concurs in the suggestion.

24. A member suggests that interpretations and rulings shown in connection with the Rules and Instructions for Inspection and Testing of Locomotive Boilers and Their Appurtenances, and the explanations of the Rules and Instructions for the Inspection and Testing of Locomotives and Tenders, be included as a part of the Proceedings. The committee concurs in the suggestion.

Rules for Determining Stresses in Locomotive Boilers

(RECOMMENDED PRACTICE.) PAGES 719-720

25. A member calls attention to the omission in the introductory paragraph of the fact that these rules apply only to new construction and not to existing boilers. The committee notes the omission and the secretary will be instructed to correct it.

Special Report on Pipe Unions

26. The committee would report that, owing to the death of H. G. Stott, chairman of the committee of the American Society of Mechanical Engineers who was to handle the matter of standard pipe unions, no progress has been made during the year.

New Business

27. A member raises the question as to the possibility and practicability of developing standards with respect to driving axles, engine truck axles, bearings, boxes and wedges along the lines of standardization now being completed in connection with freight equipment cars by the A. R. A., or the efforts in this direction made by the Harriman Associated Lines some time ago. The committee does not concur in the suggestion.

28. A member suggests a standardization of the draft gear attachments on both old and new tenders. The committee does not concur in the suggestion.

The report is signed by W. E. Dunham, chairman, C. & N. W.; M. H. Haig, A. T. & S. F.; A. G. Trumbull, Erie; C. D. Young, Pennsylvania; G. S. Goodwin, C. R. I. & P.; R. L. Ettenger, Southern; and B. B. Milner, N. Y. C.

Action Taken

There was no discussion of this report. It was received and the recommendations were adopted.

Train Resistance and Tonnage Rating

O. C. Wright
Chairman

IN ORDER THAT THIS COMMITTEE might have the benefit of the experience of the various roads in connection with train resistance and tonnage rating, Circular H, dated January 22, 1917, was issued, making request for replies to the following questions:

1. Have any tests been conducted on your road to determine the rolling resistance of freight or passenger cars of modern design other than that covered in the committee's report at the June, 1916, convention?

2. If so, what use of it has been made in connection with determining tonnage rating?

3. Please furnish curves showing the results obtained in such tests, to show the relation of resistance to weight of car or to the speed, or both.

4. Give general description of cars tested, including: (a) capacity, (b) light weight, (c) wheel base, (d) type of truck, (e) size of journals.

5. Give general description of track conditions under which tests were made, i. e., weight of rail, kind of ballast, etc.

6. Give brief description of manner in which tests were conducted.

7. Please furnish such information as you may have in regard to the value of the superheater in increasing the available drawbar pull of the locomotive, giving the source of such information.

8. What method of supervision is in effect on your road to insure that the prescribed tonnage ratings are being hauled?

9. What would you recommend as a system of supervision which would be available to all roads?

10. Is any allowance made for the mechanical stoker in the calculation or application of tonnage rating on your road?

11. If such allowance is made, describe fully the basis for it.

Twenty-five replies to this circular were received. None of the roads gave any information in regard to Questions 1, 2, 3, 4, 5 and 6 with the exception of the Baltimore & Ohio and the Pennsylvania Lines West of Pittsburgh. The B. & O. furnished a resistance curve as shown on Plate A, which was drawn as a result of tests conducted on the B. & O. during October, November and December, 1910, and January, 1911. This curve represents the average resistance of the cars used, the predominating car having the following characteristics:

Capacity	110,000 lb.
Light weight	40,700 lb.
Wheel base	28 ft. 6 in.
Trucks	4-wheel cast steel side frames.
Size of journal	5½ in. by 10 in.

These tests were conducted on track constructed of 90-lb. and 100-lb. rail with rock ballast. The average temperature under which the tests, represented by this curve, were made, was approximately 75 deg. F.

The Pennsylvania Lines West furnished a resistance curve as shown on Plate B, this curve having been drawn as a result of tests of Pennsylvania Lines' Class *Gl, Gla* and *Glb* cars, the characteristics of which are shown by the following table:

	Gl	Gla	Glb
Capacity, lb.....	100,000	100,000	100,000
Light weight, lb.....	39,200	39,050	38,700
Wheel base	28 ft. 9 in.	27 ft. 9 in.	27 ft. 3 in.
Type of truck.....	Arch Bar	Arch Bar	Arch Bar
Size of journal.....	5½ in. by 10 in.	5½ in. by 10 in.	5½ in. by 10 in.

These tests were made on track constructed with 85-lb. rail, part of which was laid on cinder ballast and part on stone ballast. The cars tested were of approximately the same dimensions as cars represented by the resistance curve as shown on Plate 11 of last year's report for 8-wheel cars. The resistance, it will be noted, is somewhat higher, which is probably due to the fact that these tests were made on 85-lb. rail, whereas the tests of the cars represented on Plate 11 of last year's report were made on 100-lb rail.

The New York Central is the only road which gave any information in connection with Question 7 regarding increased tractive power due to superheat. The information given is shown on Plate C and is for two locomotives identical

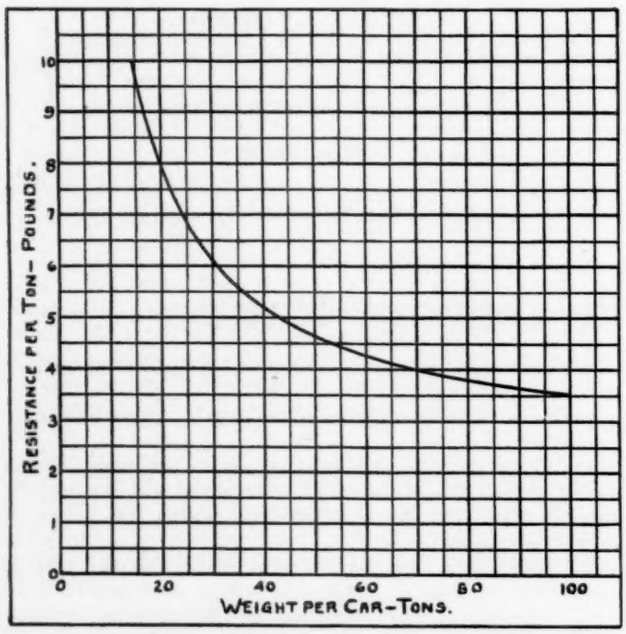


Plate A—Resistance of Freight Cars on Level Tangent Track —Baltimore & Ohio

in every respect with the exception of the superheater. The data for these locomotives are shown in the tabulation below:

Item	Saturated	Superheated
1. Class	G-6	G-6
2. Size of cylinders.....	23 in. by 32 in.	23 in. by 32 in.
3. Diameter of drivers.....	63 in.	63 in.
4. Steam pressure	200 lb.	200 lb.
5. Grate area	56.5	56.5
6. Number of large tubes.....	None	34—5⅜ in.
7. Number of small tubes.....	444—2 in.	233—2 in.
8. Tube heating surface.....	3,474 sq. ft.	2,542 sq. ft.
9. Firebox heating surface.....	185 sq. ft.	185 sq. ft.
10. Total heating surface.....	3,659 sq. ft.	2,727 sq. ft.
11. Superheater heating surface.....	None	580 sq. ft.

The following replies were received to Questions 8, 9, 10 and 11:

Chicago, Burlington & Quincy

8. The daily tonnage statement and monthly summary are checked in the general manager's office.

9. After the rates are worked up, a man in the general office should be assigned the duty of seeing that the rates are maintained, and if rates are found to be incorrect they should be revised, provided that there is no operating condition which needs correcting.

10. Stoker engines haul more tonnage.

11. Our Mikado engines with 28-in. by 32-in. cylinders, 64-in. drivers, 180-lb. pressure, and 60,000 lb. tractive power, are given an average of 7 per cent more tonnage when equipped with stokers. Our engines larger than this were equipped with stokers when purchased. With the stoker it is possible to keep up the boiler pressure on these large engines, which accounts for the greater tonnage hauled.

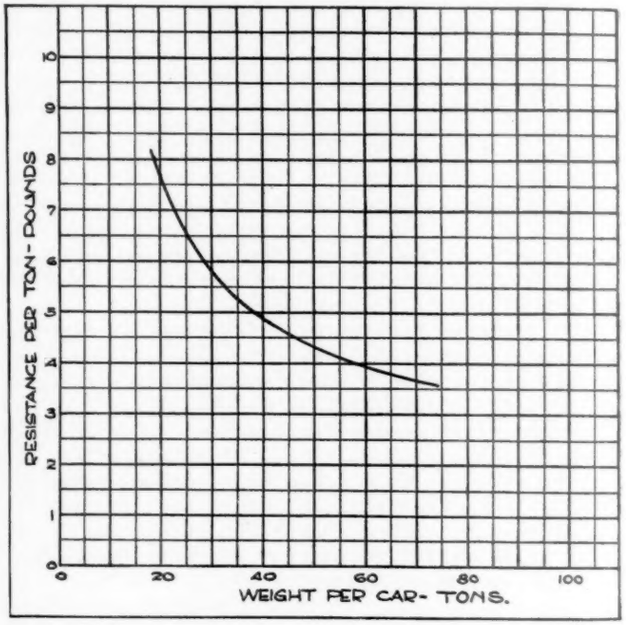


Plate B—Resistance Curve on Level Tangent Track—Pennsylvania Class G-1, G-1a, G-1b Cars

Baltimore & Ohio.

8. A daily record is kept showing the tonnage handled by each train and the theoretical rating for the given run. This statement is furnished to the superintendent, general superintendent and also the Bureau of Operating Statistics. The information given by the above record is referred to at frequent intervals for the purpose of checking observance of rating.

9. A method similar to that described in the answer to Question 8 should apply with good results to the operations on the road.

10. Yes.

11. In figuring ratings for hand-fired engines, a limit of 4000 lb. of coal per hour was fixed. With stoker engines, we have figured on the basis of 6000 to 7000 lb. per hour at maximum effort. This resulted in ratings about 10 per cent higher than with hand-fired engines of the same type.

Pennsylvania Lines West of Pittsburgh

8. There is no direct supervision to insure that the prescribed tonnage shall be hauled. Ratings are made up based on tests, calculations or general practice. If criticism is made of any rating by the division officials, investigation is made to determine the correct rating, and the rating sheets are revised accordingly.

The tonnage rating sheets are issued in book form by the superintendent of motive power and approved by the general superintendent.

9. After the adoption of a rating, which is accepted as correct by the transportation department, there seems to be no reason why full tonnage should not be hauled.

Failure of a locomotive to handle full tonnage should be investigated by the trainmaster, road foreman of engines and master mechanic and the necessary steps taken to prevent recurrence of the failure.

10. No allowance is made for the mechanical stoker in calculation of ratings.

In reply to Questions 8 and 9 other roads reported that yardmasters and conductors were required to check trains, their reports being forwarded to the transportation officers. Computing machinery is used in some cases to figure the

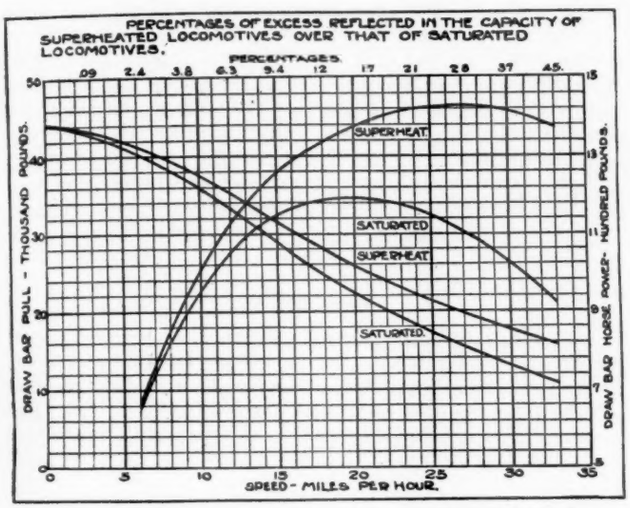

PERCENTAGES OF EXCESS REFLECTED IN THE CAPACITY OF SUPERHEATED LOCOMOTIVES OVER THAT OF SATURATED LOCOMOTIVES.
PERCENTAGES.
.09 2.4 3.8 6.3 9.4 12 17 21 28 37 45.
SUPERHEAT
SATURATED
SUPERHEAT
SATURATED
DRAW BAR PULL - THOUSAND POUNDS.
DRAW BAR HORSE POWER - HUNDRED POUNDS.
SPEED - MILES PER HOUR.

Plate C—Pull Speed Curves, Saturated vs. Superheated Locomotives. Class G-6 (Consolidation)—New York Central (Big Four)

tonnage. One road uses surprise tests by the trainmaster to insure that ratings are adhered to.

Summary

The resistance curves forwarded to the committee in answer to Questions 1, 2, 3, 4, 5 and 6 of Circular *H* and as covered by Plates *A* and *B* are submitted as a matter of interest.

The information shown on Plate *C* in regard to the value of the superheater corroborates very well similar information included in committee's report of 1916.

In regard to Questions 8 and 9 of the circular, the committee asked for this information, as it was indicated on the floor of the 1916 convention that the association desired the committee to present recommendations covering the supervision of the application of tonnage ratings. The committee was unable to obtain a great deal of information on this subject from the members to use as a guide for making such recommendations. However, the committee feels that this is a matter of very great importance and one which is not being given the attention by many of the roads which it should receive.

The supervision of the application of tonnage rating should be carried on from two standpoints:

First, from the standpoint of the mechanical department, to see that the locomotives are so designed and maintained as to be able to deliver at all times, under the conditions to which they are subjected, their rated drawbar pull. It is not sufficient to design a locomotive and say that because we have a certain size of cylinder, a certain diameter of wheel and a certain steam pressure the locomotive will at all times deliver a certain drawbar pull, corresponding to these dimensions, but it is necessary to know that the boiler is of sufficient capacity to supply the cylinders with steam at full boiler pressure and that it is possible to supply the firebox with the required amount of coal to evaporate the required amount of water. If the coal required per hour is beyond the capacity of a fireman, as it is in the case of many of our modern locomotives, a mechanical means of delivering the necessary coal to the firebox should be provided.

Second, from the standpoint of the transportation department, which should be vitally interested in this subject, and the question of loading trains under different weather conditions. Too often the setting of the rate is left in the hands of a yard clerk, who does not appreciate the importance of using the highest rate which can be hauled. The committee recommends that on every railroad the chief transportation officer provide a means of following up closely the train loading from day to day, with a view of determining the cause for hauling less than the rated tonnage and correcting the practice wherever possible.

Question 10 of the circular, in regard to taking into account the mechanical stoker, was asked by the committee in view of the fact that some of the roads have shown in their tabulated tonnage rating sheets higher tonnage for locomotives equipped with the stoker by from 5 to 13 per cent as compared with locomotives of the same type not equipped with stokers.

This committee cannot ignore the generally known fact that there are in every-day service on many railroads locomotives of a size and capacity so great that their rate of steam production, when hand-fired by a good fireman working at maximum capacity, cannot develop the maximum power for which they were designed, and that exactly similar locomotives, except that they are stoker equipped, are being operated at their maximum possible rate of steam production and developing their maximum power. It is our opinion that advantage should be taken of the opportunity of hauling whatever increase in tonnage is made possible by the ability to maintain full steam pressure by the use of the stoker. On the other hand, this is a matter of supervision, which should be taken care of in the designing of the locomotive, as in setting a proper tonnage rating it must be assumed that the specified boiler pressure can be maintained.

The report was signed by O. C. Wright, chairman, Pennsylvania; H. C. Manchester, Delaware, Lackawanna & Western; C. E. Chambers, Central Railroad of New Jersey; J. H. Manning, Delaware & Hudson; Frank Zeleny, Chicago, Burlington & Quincy; Maj. E. C. Schmidt, fuel conservation section, United States Railroad Administration; Joseph Chidley, New York Central and J. T. Carroll, Baltimore & Ohio.

Action Taken

W. E. Dunham (C. & N. W.): The present report and also the past reports of this committee have all been reports indicating what the practices are and calling attention to the latest development in actual tonnage rating of locomotives on the railways of this country. It is one of the perpetual things which will continue with us, and I think the motive power departments of the railroads should receive from this committee from year to year a memorandum of the progress and practices recommended by it upon the subject of tonnage ratings.

The President: I think it is a committee that may well be continued because each year some new developments may come up. I think a motion to receive this report and continue the committee will be in order.

Mr. Dunham: I move that the report of the committee be received and the committee continued to report progress from time to time.

The motion was duly seconded and carried.

Semi-Elliptic Springs—Manufacture and Repair

M. F. Cox
Chairman

THE ART OF SPRINGMAKING dates back many years. As applied to locomotives, we find semi-elliptic springs practically the same in design as on the first locomotives of the Phineas Davis and Ross Winans type, about 1830. The methods in machine manufacturing have changed in keeping with modern progress. The advent of improved oil furnaces and other highly specialized machinery has simplified the construction, eliminated nearly all of the expensive hand work and greatly reduced the cost of manufacture. What is said here applies to open-hearth steel of the following composition:

	Per Cent.
Carbon	1.00
Manganese	0.03
Phosphorus, not above	0.25
Silicon, not above	0.15
Sulphur, not above	0.03
Copper, not above	0.03

It is essential, that spring steel of a good, reliable quality be purchased to a specification, and also necessary that the springmakers obtain a correct knowledge of the character of the steel before beginning operations. The quality of the steel and the heat treatment are the all-important factors. Material of unsatisfactory character may sometimes be improved and made to meet the requirements by hardening at a higher temperature. A .90 carbon quality spring steel should harden satisfactorily under a temperature as low as 1500 deg. F. Spring plates which have been hardened and fail, showing a coarse, white grain, indicate overheating.

Operations in Spring Manufacture

There are eleven or twelve essential operations required in the preparation and manufacture of standard design semi-elliptic springs, mentioned below in order: shearing plates to length; upsetting, welding and punching ends of main plates (hot); rolling ends to a taper (one operation); nibbing the center of the plates; trimming the ends; rolling the plates and quenching (one operation); drawing the temper; assembling for banding; banding; testing and painting (paint bath).

Leaving the ends undrawn without any taper, practiced by some, reduces the cost by one operation, and it is claimed increases the life of the springs; the finished appearance of the spring, however, is not as neat.

The Spring

Locomotive driving springs and those for engine trucks, trailer and tender trucks are almost universally of the elliptic and semi-elliptic type, composed of a number of steel plates, according to the load they are required to carry. The plates of the various lengths are laid one upon the other, varying from 5/16 in. to 5/8 in. thick, and from 3½ in. to 6 in. wide.

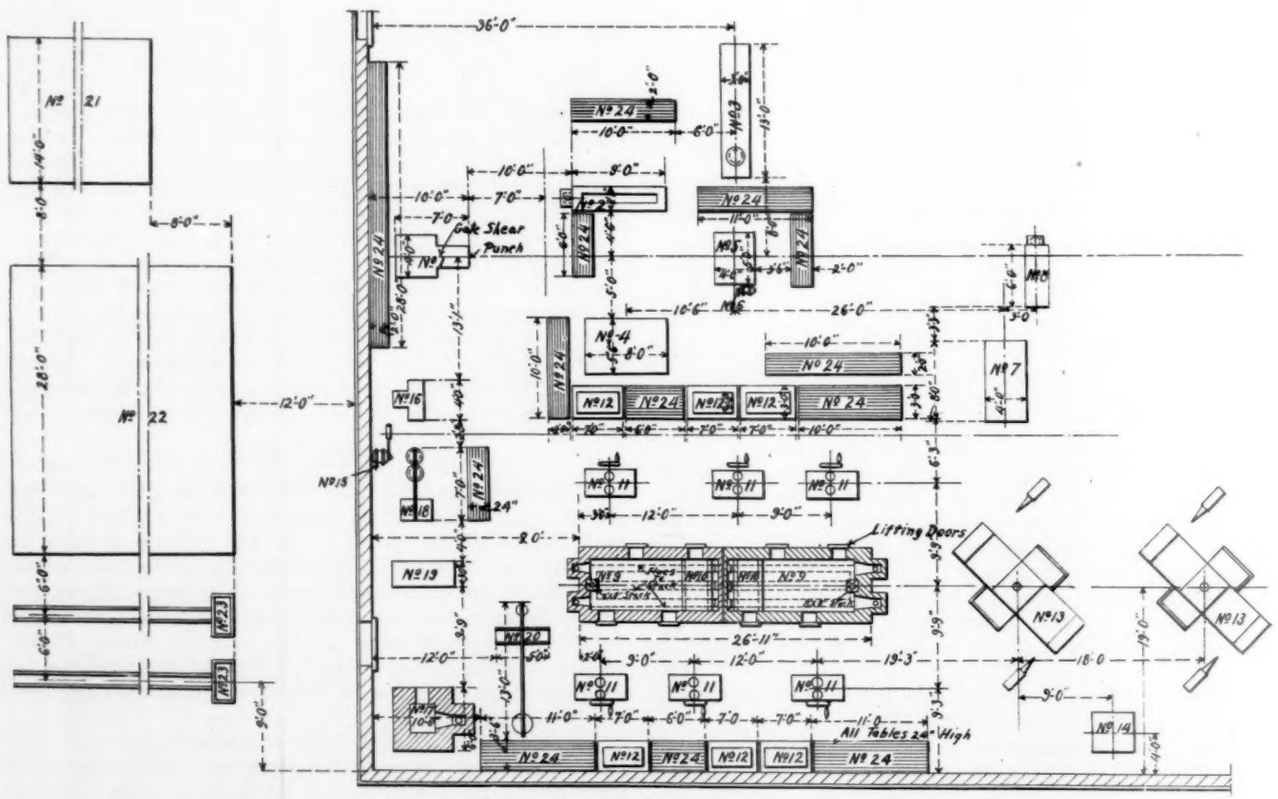


Fig. 1

For many years the popular length of springs has ranged

from 34 in. to 42 in. from center to center of spring-hanger slots. In order to standardize the shop construction, full-sized metal templates should be made for each main plate, for all classes of springs.

The length of the smallest leaf is usually made twice the width of the band, and the other plates are graduated accordingly.

A Typical Spring-Plant Arrangement

The machinery required for a railroad having 1,110 locomotives and 667 passenger cars is shown in Fig. 1 herewith, a list of which is as follows:

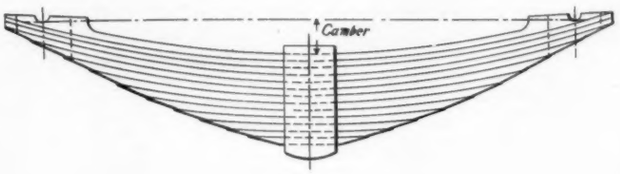


Fig. 2

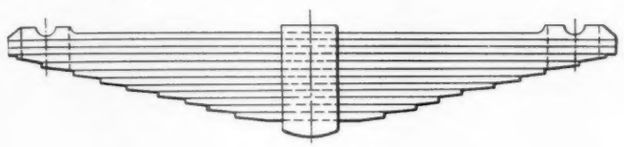


Fig. 3

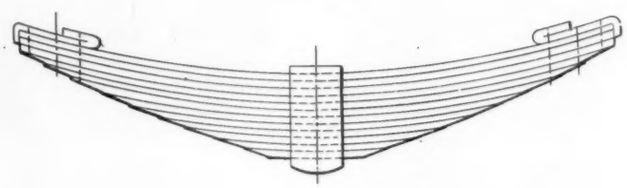


Fig. 4

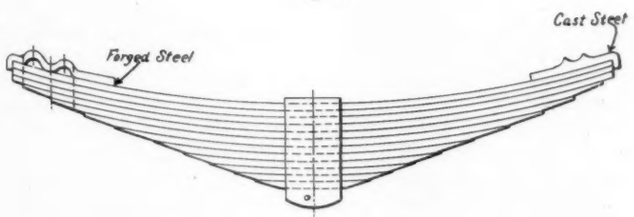


Fig. 5

No.	Machine	Size
1.	Combination punch and shear	Gib hole 6 in. by 5/8 in.
2.	Triple oil furnace for machines 1-4-5	26 in. by 108 in.
3.	Band remover	Cylinder 16 in. by 16 in.
4.	Tapering rolls	6 in. by 5/8 in.
5.	Combination trimmer and titter	6 in. by 5/8 in.
6.	Motor 8 h.p. for No. 5	650 r. p. m.
7.	Air bending machine	Cylinder 18 in. by 12 in.
8.	Oil furnace for No. 7	27 in. by 74 in.
9.	Heating furnace oil	6 men.
10.	Tempering retorts in No. 9	2 men.
11.	Spring rolls	30 in. by 60 in.
12.	Oil and water cooling vats	24 in. by 60 in.
13.	Double forges—coal	
14.	Steam hammer	1,000 lb.
15.	Motor for line shaft	30 h.p.
16.	Spring assembler air cylinder	10 in. by 12 in.
17.	Box banding furnace—oil	54 in. by 54 in.
18.	Spring bander—air	40 tons.
19.	Water tank for No. 18	30 in. by 72 in.
20.	Spring tester 1,500 lb. hydraulic pressure	50,000 lb.
21.	Spring steel shed	14 ft. by 26 ft.
22.	Spring storage shed	28 ft. by 34 ft.
23.	Paint tanks and dripping racks	24 in. by 48 in.
24.	Serving tables 24 in. high	1½ in. by ¼ in.-iron.

The material throughout this department goes forward without side or back movement.

Fig. 2 is a finished spring used for general purposes and is the accepted standard design. Fig. 3 occupies less vertical height and will take a shorter hanger than Fig. 2. The more camber and set a spring has, the stiffer it is apt to be. It is better to design driving springs a little stiff than otherwise. Many manufacturers are now making locomotive springs with plain main leaves and end clips, as shown in Figs. 4 and 5. By this method two expensive operations are eliminated and the cost of manufacture reduced. These clips serve best when made of scrap spring steel, boiler steel or drop forging. Malleable-iron or cast-steel clips are only satisfactory on very light equipment.

The practice of manufacturing the main plates as shown in Fig. 6 is still standard with many railroads for engine and trailer truck springs as well as for driving springs.

Bandmaking

In small shops, where bandmaking is done by hand and the stock is usually selected equal to that of crown band, the fuller is used as shown in Fig. 7, after which the ends are drawn down, bent and welded. Where the stock is standard for size of band, the bending may be performed as in Fig. 8*a* on an air press, and welded by hand or Bradley strap hammer. Fig. 8*b* represents the most approved method of machine-made bands; the bending is done on an air machine and welded in a four-inch forging machine.

Setting

The setting or cambering operation precedes the tempering. Spring manufacturers differ somewhat on this point and also as to the spacing of the plates to provide for freedom and flexibility. Some think the shrinkage which occurs in the hardening process provides for this, while others insist that no extra space should be allowed. Experience in one shop has demonstrated that a space of 5/16 in. should be allowed between the main and the adjacent plates, diminishing toward the shortest one to within the last four or five plates; these may be set without any space allowance. See Fig. 9.

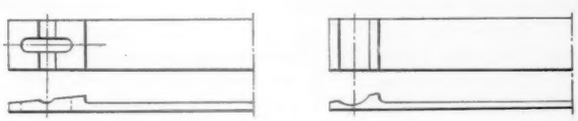


Fig. 6

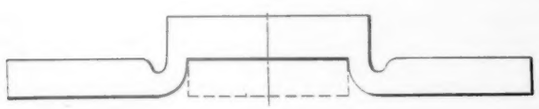


Fig. 7

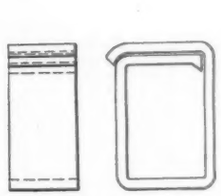


Fig. 8a

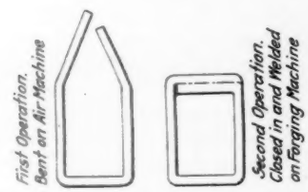


Fig. 8b

A number of plates may be placed in the fire together, as many as the operator can handle to advantage; after heating slowly to a good red color, they should then be drawn down with short, rapid strokes of the hammer or rolled as before stated. The steel should be worked at a moderate heat and at as even temperature as practicable. Overheating the ends and corners is to be avoided, as it often causes them to chip off and fracture.

Tempering

In the tempering of spring plates, good judgment is required in order to meet with reasonable success. First of all, the furnace must be constructed exactly right and be under perfect control in order to maintain a uniform temperature throughout this very important process. If this is not done, the results will be confusing and unsatisfactory. Where a large number of springs are to be tempered in oil, it is necessary to have an oil tank of at least 200 gal. capacity, surrounded by a volume of water sufficient to keep the oil moderately cool, and there should be a false bottom or grate to prevent the spring plate coming in contact with the accumulation of scale and dirt which forms at the bottom.

Fish oil has been generally used in tempering, and it has proven satisfactory. Other varieties of oil and compounds are in use for which good results are claimed.

It was thought at one time that oil, after becoming hot, would not harden steel as effectively as cold oil or cold water. Long-continued practice has proven that steel spring plates, when hardened in oil moderately hot, possess all the requisite qualities. Some springmakers, after tempering, allow the plates to cool in a separate bath of oil and slowly harden, in order that the shape of the plates may change as little as possible.

After the leaves have been rolled to camber and tempered by quenching, the next operation is to place the plates in a retort, such as is shown in Fig. 1, which is a part of the heating furnace (No. 9) where the plates are brought up to a temperature (known as the flashing point) at which they become blue when cooled in air. This relieves any local strains that may set up in the hardening process, and gives a uniform temper and produces springs of good quality.

A tempered plate, after becoming cold, should not be struck with a hammer, as it often leads to fracture after the spring has been placed in service. A majority of all the ordinary tempering is left to the eye of the skilled operator, a method which is not altogether reliable. By the use of a pyrometer, or other heat-measuring instrument, much of the uncertainty of this operation may be eliminated and more satisfactory results obtained.

Then follows the assembling of the plates, clamping same tightly, in machine No. 16, Fig. 1. The band is heated

Fig. 9

in Furnace No. 17 and applied in machine No. 18. Care should be exercised that the band be placed exactly central, in order that the load may be distributed evenly; it should be made to the correct size, heated and put quickly into place with 40 to 50 tons pressure, and cooled in a water tank, No. 19.

The use of hydraulic or pneumatic power for this operation is essential. Testing the springs for uniformity of set under load is done under scale No. 20, after which they are ready for the paint bath.

Furnaces

The heating of spring plates is of vital importance, and no single detail contributes more to the success of this operation than a perfect-working furnace. The furnace hearth should be made equal to that of a sand-bottom furnace, so that the steel may find a suitable surface to rest on. The heat should completely surround and uniformly penetrate the piece of steel. Pyrometer readings should be taken periodically at different locations within the furnace to insure that a uniform temperature is being maintained over the entire furnace.

Spring Repairing

The operations required in repairing elliptic and semi-elliptic springs are few and simple. After the spring band is taken off, an inspection of each plate is made for superficial defects. Plates which are found to be pitted or badly corroded are discarded. A close inspection will disclose most of the imperfections. Care must be used in the selection of such of the old plates which appear suitable for

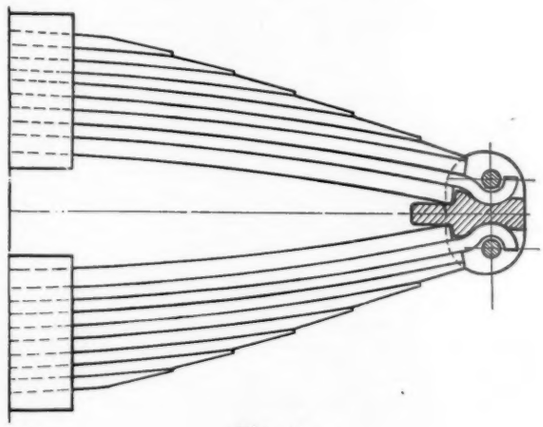


Fig. 10

further use. It is not correct to use plates of different thicknesses; uniform flexibility will be impossible with such a practice. It has been demonstrated that a plate, for example, 7/16 in. thick, worked in among those 3/8 or thinner, will be the first one to break.

Reclaiming spring plates is not altogether a satisfactory operation. It is a question whether it is not more economical in the end to supply new plates throughout. It has been noted that in substituting new plates of original strength for old ones, the new plate will often be the first to fail. If the camber in an old plate is standard, it indicates suitability for further service. One road reports the labor cost for repairing springs for eight months of last year at an average of .017 cents per lb. Another reports cost of manufacture of new springs for the past four years at $1.07 per 100 lb. and repairing at 72½ cents per 100 lb.

The operation of re-applying an old spring band is the same as that required for a new one, as is also the retesting of the spring. Spring inspection should include loose bands, broken plates, free height below standard and total thickness of plates at edge of band.

End Connections

The ends of tender springs are subject to frequent failures; perhaps 70 per cent of them fail on this account.

Fig. 21 shows a design for overcoming this trouble. Under normal load the ends of each spring bear upon the recessed portion of the end forging; as the load is increased the bearing points are supplemented and reinforced, thereby shortening the length of the springs automatically and providing additional strength to take care of the extra load.

In conclusion, we believe it good practice to concentrate all spring work at one shop, the one most centrally located, where men may be trained and made expert in the art of springmaking. At this place there should be all necessary tools and scientific equipment that will insure a uniform as well as a high grade of workmanship. The greatly increased

size and weight of modern locomotives makes this subject one of considerable importance. There is still room for improvement, both as to methods of repairing and manufacturing springs.

The report was signed by M. F. Cox (chairman), Louisville & Nashville; Eliot Sumner, Pennsylvania; A. G. Trumbull, Erie; E. W. Pratt, Chicago & North Western; T. A. Foque, Minneapolis, St. Paul & Sault Ste. Marie; C. A. Gill, Baltimore & Ohio and G. W. Rink, Central Railroad of New Jersey.

Action Taken.

There was no discussion of this report. It was received and the committee discharged.

Development of Locomotive Feed Water Heaters

By J. Snowden Bell, Associate Member

J. Snowden Bell
Individual Paper

THE ECONOMIC VALUE of an appliance by which any substantial portion of the heat units contained in the waste gases of combustion and the exhaust steam of a locomotive can be made available in heating boiler feed-water, is too obvious a proposition to require discussion, and it was recognized by engineers at a very early day. While experiments have been made from time to time with numerous appliances of this character and have ordinarily failed to prove sufficiently satisfactory in practice to cause them to be continued in regular service, the undeniable correctness of the general principle upon which they are based warrants, if not positively demands, its renewed consideration, particularly in view of the rigid economies in every department which present conditions have rendered indispensable, not merely to the profitable operation, but even to the very existence of the railroads of the United States.

After a general review of a number of feed-water heaters, A. L. Holley, in his comprehensive book, *"American and European Railway Practice in the Economical Generation of Steam,"* 1861, makes the following statement:

"It is impossible to state the exact economical results of feed-heating—either the saving of fuel or the cost of repairs; because no experiments which fairly estimate all the conditions have been made. It is quite sufficient, for present purposes, however, to know that there is a saving worth making, and it is very obvious that the cost of maintaining such heaters as Clark's and Eaton's can not materially detract from the economy. *It would, therefore, be unreasonable to neglect this improvement any longer,* on lines, at least, where fuel is expensive." (p. 130.)

Mr. Holley's statement is as correct and noteworthy to-day as when written 56 years ago, and its importance is accentuated by the fact that appliances of improved construction have been produced since he wrote it, and by the urgent present demand for the adoption of every improvement for which an operative economy, greater than the cost of construction and maintenance, can be assured with reasonable probability.

Feed-water heaters are of two different types, which may be termed, respectively, (a) "surface" heaters, being those in which the heating medium, either gases or steam, is applied to the surfaces of channels or passages (usually tubular) through which the feed water traverses on its way to the boiler, and (b) "injection" heaters, in which steam is discharged directly into the feed water. The former type, in which the transfer of heat from gases or steam to the feed water is effected through walls of comparatively thin metal, is that which has been the more frequently experimented with, and, for several reasons, would seem to be the more practical and desirable of the two types.

[The author sketched the development of feed-water heaters from 1802 up to the present time showing the designs and giving descriptions of those experimented with both in the United States and abroad, the last one described being that of the Locomotive Feed Water Heater Company.—Editor.]

In a report on a system of feed-water heating used in France, the following conditions were laid down by a committee of French engineers, in 1896, as being those which should be followed as nearly as possible in a locomotive feed-water heater:

"First.—Simplicity, and facility for examination, cleaning and overhauling.

"Second.—That the heater should take up little room and be of a minimum weight.

"Third.—The heater should give a continuous and certain supply of hot water.

"Fourth.—That the feed heater should be heated by steam that would otherwise be lost.

"Fifth.—That the steam used for the heater should vary with the quantity of feed required."

The paper of Trevithick & Cowan (*Proceedings, Institution of Mechanical Engineers,* March-April, 1913, pp. 353-356) clearly indicates that to effect the increase of the temperature of feed water to such a degree as will result in a substantial economy sufficient to warrant the application of a feed-water heater, a pump must be adopted as the feeding member instead of an injector, and this has been done in the systems before noted as having met with approval in European practice. After stating that two feed-water heating agents are available, *i. e.,* the exhaust steam discharged from the cylinders and the waste gases passing out of the stack, and that the process may result in reaching temperatures at which even the so-called hot-water injectors will not work, they proceed with what they term "a reconsideration of the feeding system generally," the following excerpt from which is believed to be of sufficient interest to be here presented:

"The ordinary injector will not pick up water above about 120 deg. to 125 deg. F., and the feed cannot, therefore, be effectively heated before it reaches the injector, while the admixture in that apparatus of live steam with the feed so raises the temperature of the latter that full advantage can not be taken of subsequent heating by either of the agents available. An injector may feed into a boiler at 180 lb. per sq. in. pressure, about 11.2 lb. of water for every 1 lb. of steam used. If the supply be at 65 deg. F. the delivery will be about 160.5 deg. F. This increase is not an economic gain. Delivery falls off as the boiler pressure rises, and the temperature of delivery is higher at the higher pressures. Subsequent feed-heating is of less advantage now than it would have been when pressures were lower.

"For each 1 lb. of steam used in the cylinders (1 + a fraction) must be produced in the boiler, from the temperature of the injector discharge, in order to supply both the engine and injector. The B. t. u. thus to be produced are given for various pressures in Fig. 1, by curve No. 1, which is based on data published by S. L. Kneass. If, subsequent to delivery from the injector, the feed be heated by the cylinder exhaust to 210 deg. F. the boiler work is reduced, as denoted by curve No. 2. The work needed increases with the boiler pressure. Heat can further be transmitted from the waste gases, and an average feed temperature of 280 deg. to 290 deg. F. obtained, but compensation can in no way be secured for heating during part of the process with live steam.

"At modern pressures the ordinary exhaust injector shows a thermal saving over the live-steam injector of some 9 per cent. The supplementary portion of the exhaust injector is handicapped by the water fed to it being already at a high temperature (about 180 deg. F.). Its steam consumption is thus high, and the final temperature of discharge is about 280 deg. F. Additional feed-heating is thus impracticable, even by the waste gases. The only gain procurable with this injector is that due to the use of part of the exhaust steam; this, however, may exceed the thermal gain of 9 per cent or so. In a more recent form of exhaust-steam injector the efficiency of the exhaust-steam jet has been improved, and much less supplementary live steam is needed. Though the thermal position is the same with both types, the discharge temperature is thus lower with the later pattern. The final temperature with the later type is 195 deg. F. compared with 280 deg. F. with the earlier, and further feed-heating is practicable.

"The pump offers advantages over the injector in connection with feed-heating since, with it, the feed temperature is not increased in the process of raising the pressure, and the temperature head is sufficient for the effective transfer of heat to the pump delivery, successively from the exhaust steam and the waste gases. On account of the sudden demands which a locomotive feed pump is called upon to meet, such an appliance should be arranged to work with water at moderately low temperatures, and the greater part of the feed heating process should be carried out between the pump and the boiler clack.

"Independent steam pumps suitable for locomotive work will deliver 100 lb. of water for about 1.5 lb. of steam, working at end against 180 lb. pressure. Curve No. 3, Fig. 1, shows the B. t. u. to be provided by the boiler for each 1 lb. of steam delivered to the cylinders, using pump supply and feed at 65 deg. F. Curve No. 4 shows the work required if the pump exhaust be utilized for feed-heating, about the same amount being required at all pressures. The pump and injector are then on an equal footing at modern pressures. Heating, further, by the main cylinder exhaust to 210 deg. F., reduces the boiler work to the amounts shown by curve No. 5. This system has a considerable advantage over the injector feed combined with heating to 210 deg. F. (see curve No. 2), and this is maintained if the feed-heating be carried still further."

The circular of inquiry which was addressed to the members of the Association and a few foreign motive-power officers, asked their opinion whether or not the application of feed-water heaters to locomotives, if a successfully operative design could be applied, "would be of advantage or effect sufficient economy of fuel to justify the cost of application and maintenance." In a few instances the replies were to the effect that the writers had not had any experience with feed-water heaters, and therefore did not feel warranted in offering an opinion, but in almost all the other cases the expressions were favorable to the feed-water heater.

Upon the basis of the unquestionable advantage obtained in the long-established use of feed-water heaters in stationary and marine practice; the reported satisfactory results of their operation on European locomotives; the probable increase of advantage from their use in connection with the now practically universal application of superheating; and the views expressed by the large majority of the replies of members to the writer's circular of inquiry, the following conclusions, as to the question of the advisability of the application of feed-water heaters to locomotives, are submitted for the consideration of the Association:

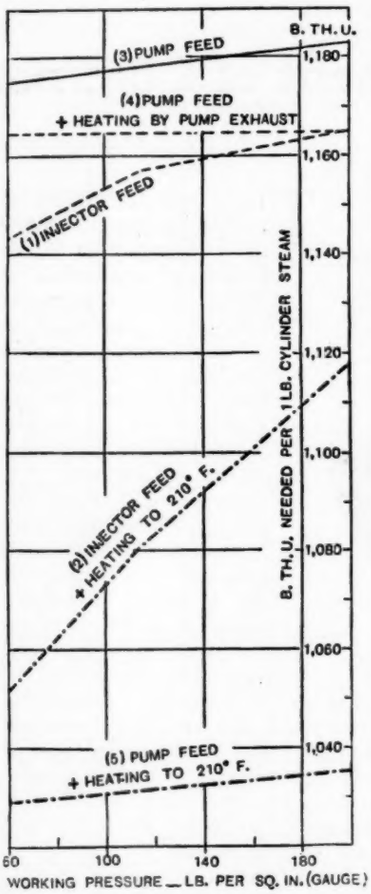


Fig. 1 — Saturated Steam Boiler Output in B. t. u. Necessary with Various Conditions of Feed for Each Pound of Steam Used in the Cylinders.

(*a*) That the theoretical advantages of an appliance of this type, in the economization of fuel and boiler maintenance, or a corresponding increase in boiler capacity, are attainable without involving a structural complication and cost, and expense of upkeep, that would be sufficient to reduce such advantages to any appreciable extent.

(*b*) That an economy of fuel of at least ten per cent, as well as a reduction in the cost of boiler maintenance, under normal conditions, can be obtained by the application and operation of a correctly designed locomotive feed-water heater.

(*c*) That in order to be acceptable and of practical advantage in locomotive service, the design of a feed-water heater should, *first*, comply with the five general requirements of the Committee of French Engineers, noted above; *second*, should not be complicated by appliances for heating by the waste gases, but should utilize exhaust steam only as a heating medium; and, *third*, should provide for the separation and deposit of mud and saline matters, and should be easily accessible for their removal and for repairs.

Action Taken

The report was received without discussion.

Other Business

Dues of the association will remain the same as last year.

Owing to the resignation of Wm. Schlafge as president of the association, an election of officers was necessary. The following were elected: F. H. Clark, general superintendent motive power, B. & O., president; W. J. Tollerton, general mechanical superintendent, C. R. I. & P., first vice-president; C. F. Giles, superintendent machinery, L. & N., second vice-president; C. H. Hogan, assistant superintendent motive power, N. Y. C., third vice-president; and H. C. Manchester, superintendent motive power and equipment, D., L. & W., member of the executive committee.

General News Department

G. V. Lomonosoff, head of the Russian railway mission to the United States, has been dismissed by the Russian ambassador because of a political statement.

Max Thelen, president of the California Railroad Commission, has been appointed supervisor of war contracts under Quartermaster General Goethals.

The Railroad Detectives' Association convention, which was to have been held in Baltimore this week, has been abandoned; this because of "unforeseen conditions breaking out on the railroads."

The machine shop of the Texas & Pacific at Marshall, Tex., was destroyed by fire on June 9; estimated loss, including machines, patterns and valuation records, $300,000. The boiler shop and the erecting shop were slightly damaged.

James N. Wallace, president of the Central Union Trust Company of New York, has been appointed a member of the advisory committee to the director of the division of finance of the Railroad Administration. The other members of the committee, previously announced, are Franklin Q. Brown, chairman; Festus J. Wade, and Frederick W. Scott.

The salary of the chief inspector of locomotive boilers of the Interstate Commerce Commission is to be raised from $4,000 to $5,000 a year, the salaries of the two assistant inspectors from $3,000 to $4,000 and of the district inspectors from $1,800 to $3,000; all by virtue of a law passed by the Lower House of Congress, on June 5, and by the Senate, on June 18.

The Chicago, Burlington & Quincy has organized 50 students of the University of Chicago into a special gang which will start for Sheridan, Wyo., on June 17 to spend the summer on track work in that vicinity. This road has also secured nearly 300 high school boys for its track gangs as a result of a campaign which local officers have made in the high schools.

Employees of the Pennsylvania Railroad in military or naval service, including those from lines both east and west of Pittsburgh, now number 16,407. This is shown by reports just completed for the purpose of revising the figures on the service flag which hangs in Broad Street Station, Philadelphia. When the flag was first hung, March 20, 1918, the single blue star in the center contained the number 11,769, showing an increase of 4,638.

Scarcity of steel is now so very general that the amount which may be used for railroad purposes will be determined only after careful scrutiny. The agreement between the American Iron and Steel Institute and the War Industries Board, providing for complete government control of the distribution of steel and steel products, was noticed last week. When a railroad requires steel, the need for it must be first approved by the Regional Director, and it must then be passed upon by J. Leonard Replogle, director of steel supply for the War Industries Board, who assigns the manufacture to one of the various plants. The steel required for the government cars and locomotives was allotted by Mr. Replogle through the American Iron & Steel Institute. After the priority of manufacture has been established, it is then necessary to arrange for priority in transportation.

The appropriation for railroad valuation was discussed in the House on June 14, and an effort was made by Representative Walsh of Massachusetts to strike out the provision in the sundry civil bill $3,500,000); but he did not succeed. Mr. Walsh took the position that values have so increased that the work when finished will be of but little real value, and that the men and money employed in the work could be better employed in other ways. Representative Shirley, chairman of the appropriations committee, defended the bill, saying that the field work is 70 per cent completed, and will be finished in January, 1920, while the office work should be completed a year later than that. He said the commission proposes to have a division whose special duty it will be to check up the additions made by the railroads so that the valuation will be brought up to date. An amendment to strike out the appropriation was rejected without a record vote.

The airplanes carrying letters between New York and Washington have completed their first month's operation, and it is announced in Washington that during this time they have carried over five tons of mail matter. The post office department regards the demonstration as successful, but is disappointed because the quantity of letters offered has not met expectations. A reduction in rates, from 24 cents an ounce to 16 cents, is under consideration. A considerable number of trips have been omitted because of fogs, the total number of which, however, is not mentioned. To surmount the difficulty of fogs it is proposed to have signal stations on the outskirts of New York and Philadelphia so that audible signals can be given, to enable aviators to get their bearings. The distance travelled in this first month is given as 11,109 miles. On June 12, Lieut. Culver made the trip from Philadelphia to New York, in 42 minutes, or at the rate of 127 miles an hour.

Messengers of the Western Union Telegraph Company were summoned before Grand Juries at Boston, New York and Washington, last Thursday morning, June 20, on charges of carrying letters on passenger trains contrary to the postal laws, which forbid the transmission of letters by private parties outside the mails. These messengers were carrying "night letters" between the cities named, and it is said that this practice has been in vogue for several months past. It appears that copies of these telegrams suitable for delivery at destination are typewritten at the originating office, and messengers have carried large numbers of them, presumably because of congestion on the wires. It is said that the Post Office Department has had knowledge of this transportation of letters by train for several months past, but it is quite generally assumed that the present action of the officers of the law has been instigated by the Commercial Telegraphers' Union, which is seeking to break down the rule of the Western Union that members of that labor organization shall not be employed in its offices.

Railroad Men Thanked

Director General McAdoo has issued a circular expressing his appreciation of the patriotism of the railroad employees of the company who subscribed for Liberty Bonds and urging them to invest in War Savings Stamps. The circular says, in part:

"I am deeply gratified to learn of the large number of railroad employees who have subscribed for the third issue of Liberty Bonds. . . A large number of railroad employees will receive substantial amounts of back pay. . . I earnestly urge upon every railroad employee who has thus secured increases in pay to invest as much as he possibly can in the War Savings Stamps."

The Cost of a Collision

Reports from Bardstown, Ky., tell of a number of settlements which have been made by the Louisville & Nashville for the death or injury of passengers in the Shepherdsville wreck last December. The Rev. H. H. Mashburn receives $13,000 for the death of his wife; Lee Roby, for injuries, $1,600; Arch Pulliam, $12,500 for the death of wife; Tom Miller, $12,000 for the death of wife: daughters of E. T.

Cherry, $32,000, for death of father, mother and brother; Tom Craven, Cox Creek, $15,000, for death of wife and son; Mack Miller, $25,000, for death of wife and son; J. B. Overall, $16,000, for death of son and sister; Dr. R. H. Miller, $13,000, for death of wife; three daughters of Charles Johnson, $8,000, for death of father.—*Nashville Banner.*

Patriotic Texas Station Men

[From a Southern Pacific Agent.]

Mr. W. E. Costello,
Superintendent, Ennis, Tex.

Dear Sir—

In view of the existing and ever-growing scarcity of labor, both local and national, we the employees at this station vote to reduce the force by one man, thereby adding materially to the man-power and treasury of the Government.

We believe it is no longer a matter of each man doing his bit, but rather a matter of doing his utmost; and we shall distribute the work of the relieved man as equally among us as possible, and endeavor to keep the work of the station up to standard efficiency. (Signed by the agent, cashier and two operators.)

Inspection and Test Section

H. E. Smith, engineer of tests of the New York Central, has been named as chief materials inspector of the Inspection and Test Section of the Railroad Administration. He will have charge of the inspection and testing of all the material purchased for use of the Railroad Administration.

C. T. Markel, general foreman and chief locomotive inspector of the Chicago & North Western, and **J. A. Rickabaugh,** supervising inspector of the Pennsylvania, have been appointed respectively, chief construction inspectors of locomotives and cars. They will have charge of the inspectors at the various locomotive and car plants throughout the country where the Railroad Administration has purchased equipment.

Engineer Officers' Training Camp

An Engineer Officers' Training Camp will be opened about August 1 at Camp Humphreys, Va., where 2,000 candidates for commissions as captains and first lieutenants will be trained under the same facilities provided for the 17,000 engineer replacement troops now there preparing for overseas service. These facilities include the ordinary military arrangements, and in addition, some fifteen special schools to instruct men on such operations as mining, quarrying, gas and flame defense, barb wire fortification, water supply and railroad communication. Many applications for entrance to the training camp have been received. To examine these candidates, General Black has designated a traveling board which will visit several of the larger cities and determine the physical and mental fitness of the applicants. Candidates for first lieutenancies should be between 32 and 36 years old, and those for captaincies, between 36 and 42.

Alaska Railroad

Charles A. Sulzer, delegate from Alaska, made an unsuccessful effort in the House on June 15 to secure an increase from $5,250,000 to $7,250,000 in the appropriation for continuing the work on the construction of the Alaska railway. Mr. Sulzer said that while last year the Alaskan Engineering Commission obtained $14,000,000, the Department of the Interior this year, on account of the war, reduced its estimate by 50 per cent to $7,350,000; and he presented a letter from the acting secretary of the interior, saying that the further decrease recommended by the appropriations committee would work a serious hardship. The letter said that a force of over 2,500 men is now employed upon the work, and that if the appropriation be made less than the estimate, a dispersal of the force is likely to result. Mr. Sulzer said the reduction proposed by the committee would cut out the projected extensions on the north end of the Anchorage division from the Susitna river to Hurricane Gulch and the south extension of the interior division from Lignite to Riley creek. Representative Mondell, who spoke on behalf of the appropriations committee, defending the reduction, said that the recommended appropriation would be sufficient to keep the organization intact and to extend the Seward division to the Turnagain Arm, while the line between Turnagain Arm and Anchorage would be completed with funds now available.

Train-Lot Movements of Oil to Be Extended

The Car Service Section of the United States Railroad administration held a conference at Washington on June 7, with representatives of the various railroad regions, the Fuel Administration and oil producers and refiners. The experience of the railroads in the western region in handling oil in train lots was discussed in detail. (The train-lot plan was described in the *Railway Age* of May 24, page 1275.) It was pointed out that the plan has proved so successful in the "mid-continent" oil fields that there is now a surplus of approximately 1850 tank cars in that territory. As a result an increased output of oil is now possible. The application of the train-lot plan of moving oil in the other railroad regions received considerable attention at the meeting and will be the subject of further study by the several regional operating officers. A steady increase in oil traffic is expected as long as the war continues.

Imported Injury Suits Not to Be Heard

The first judicial action following the issuance of Order No. 26 by the director general of railroads took place in the Hennepin county (Minn.) district court, when a personal injury case imported from Nebraska was continued until the end of the war. The injury sustained by the plaintiff occurred last year at Center City, Neb., or about 700 miles from the court. The section of the director general's order which forbids the trial of such cases until after the period of government control aims to prevent such interference with efficient railroad operation as would result from requiring railroad officers and employees to go long distances from their work to appear in court. The action of the Minnesota court virtually removed from its calendar 150 other suits of a similar character. Minnesota tribunals, and especially the courts of Hennepin county, have been a "dumping ground" for personal injury suits originating all over the Northwest.

Freight Claim Agents Meet at Chicago

In response to a call by the regional director, 75 freight claim agents from the principal western railroads met at Chicago on June 12 to consider the formulation of uniform rules for the settling of claims. Methods of reducing the number of claims and of investigating and disposing of claims more promptly were also discussed. It was believed feasible to do away with a great deal of investigation which was necessary under corporate control of railways instead of tracing to fix the responsibility for liability on one of the roads participating in the movement of a shipment, some plan will be devised according to which claim payments will be prorated among the participating roads on a mileage or some other basis. The recommendations of the meeting will be considered by the Railroad Administration, and no doubt will lead to some action by it in the near future.

Railroad Administration Receives Conscience Money

The Railroad Administration the other day received the first item for its "conscience fund" in a letter from a man who enclosed $100 to pay for various rides he had enjoyed on railroad trains without the formality of meeting the ticket collector face to face. He also enclosed an itinerary of his free trips, which he asked to have checked up so that he might be informed whether he owed more than the $100. As he did not mention the dates of his rides, the Railroad Administration is not quite sure as to the proper tariff rate to be charged for "side-door Pullman" accommodations, nor as to whether or not the rides were taken before or after the railroads were taken under government control. Therefore, it probably will be compelled reluctantly to appear

less conscientious than its correspondent and will not attempt the difficult task of allocating the $100 to the treasuries of the various railroads. This is on the theory that the conscience of the repentant traveler was revived by the fact that the railroads were taken over by the government, and that he would have been less likely to have sent the money to private corporations.

U. S. Employment Service to Regulate Labor

The government is to control labor distribution as completely as possible. After August 1, industries employing more than 100 men will be required to employ common labor through the United States Employment Service. The Department of Labor aims at the elimination of private competition for workers, and all government departments and boards concerned with war production and having to do with the letting of contracts for war materials have agreed to its plans. Felix Frankfurter, assistant to Secretary of Labor, is chairman of the "War Policies Board" of the Department of Labor. All war industries will be requested to facilitate in the centralization program by stopping independent labor recruiting activities which have demoralized the labor market, caused a tremendous labor turnover, and kept a large part of the available labor constantly jumping from one place to another.

President Wilson on June 17 issued a proclamation approving the plan and urging all employers engaged in war work to refrain from recruiting unskilled labor in any manner except through the central agency.

Claims Attorneys to Simplify Their Work

A. H. Smith, Regional Director, New York City, quoting a letter from the Railroad Administration at Washington, asks all the railroads in Eastern territory to provide for conferences of claims attorneys, looking to the adoption of a uniform policy with respect to handling personal injury claims while the roads are under federal control, the desire of the administration being (1) to prevent the causing of loss or injury; and (2) to deal with any claims which occur directly with the person or persons affected, in the simplest possible way without the services of an intermediary. The federal control act contemplates that suits for personal injuries may be brought as heretofore, but provides that executions may not be levied on the property of the carrier while in the possession of the Government. This means that while a judgment may be recovered, it devolves upon the director general to provide for payment, and this places upon him the responsibility of considering the merits of the claims and the persons to whom payment is made. It is the desire of the director general that justice shall be done to all employees who are injured in the discharge of their duties, but verdicts based upon prejudice or passion cannot be countenanced. It will be the policy of the Government to discourage litigation, and to deal directly with injured persons.

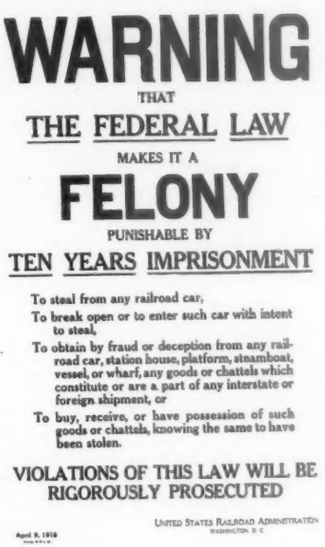
Progress of Mountain Home Association

The board of directors of the Railroad Men's Mountain Home Association announces that the organization now owns an entire ranch of 160 acres as well as three cottages and many other improvements now on the property, including a spring-house and barns. The ranch has been the summer home of a number of people for 25 years and one of its attractions is a remarkable view of Denver and the surrounding country for a radius of more than 100 miles. The ranch can also be seen from Denver (20 miles) the site of the home being about 2,000 ft. higher than the city. The association hopes to have the cottages ready for occupancy in about 60 days and will then be able to accommodate approximately 50 men.

Railroads in increasing numbers are encouraging their employees to contribute to the support of the home and voluntary contributions from individual employees of other lines are also being received in increasing amounts. The creation of the home and its purpose were discussed in the *Railway Age* of March 22 and May 24. This recuperation camp is primarily for convalescent railroad men returning from the front. While President Wilson has approved this project, it is independent of government support and is maintained solely from the voluntary contributions of those interested in making it a success. Those desiring to support the undertaking should remit to the First National Bank of Denver, the treasurer of the association. Attention is called to the "Thrift Card" plan for raising funds for the home, recently endorsed by the Association of Transportation and Car Accounting Officers. The secretary of the car accounting association has sent a Thrift Card, with one stamp affixed, to each member with the request that the recipient fill the card and forward it to the treasurer of the mountain home.

Railroad Administration Warns Thieves

The property protection section of the Railroad Administration has prepared a poster, 14 in. by 22 in., which is being issued in large numbers to advise the public of the heavy penalties provided under the laws of the United States for stealing or tampering with railroad property. The poster which is reproduced here will be put up in conspicuous places in every railroad passenger and freight station, in railroad yards and shops, on flagmen's shanties, on railroad cars and, in fact, in all places where railroad property has been subject to theft in the past. It is believed that the thorough dissemination of information concerning the severity of punishment under the federal law will prove of material assistance to the secret service of the railways in its campaign against thieves. The manner in which the Railroad Administration has been unifying and strengthening the detective forces of the carriers was outlined in the *Railway Age* of May 10, page 1,158, and of June 14, page 1,447.


WARNING

THAT

THE FEDERAL LAW

MAKES IT A

FELONY

PUNISHABLE BY

TEN YEARS IMPRISONMENT

To steal from any railroad car,

To break open or to enter such car with intent to steal,

To obtain by fraud or deception from any railroad car, station house, platform, steamboat, vessel, or wharf, any goods or chattels which constitute or are a part of any interstate or foreign shipment, or

To buy, receive, or have possession of such goods or chattels, knowing the same to have been stolen.

VIOLATIONS OF THIS LAW WILL BE RIGOROUSLY PROSECUTED

UNITED STATES RAILROAD ADMINISTRATION

WASHINGTON, D. C.

April 9, 1918

Reduction in Mail Pay

The annual rate of compensation to the railroads for carrying the mail was over $8,000,000 less on March 31, 1918, than it was on October 1, 1916, according to a statement by Postmaster General Burleson, in a letter to Representative Ayres on June 15, in reply to a statement questioning the economy resulting from the establishment of the space basis of payment. The space basis went into effect at midnight of October 31, 1916. "At that instant," he said, "not the actual pay, but the annual rate of pay to the railroads increased $3,250,000. However, the Post Office Department immediately began its readjustment of the transportation system by a system of intensive loading and of more rational despatching of the mail, with the result that the annual rate of pay to the railroads quickly and steadily declined. The Post Office Department's expectation of saving $7,000,000 is fully justified, as will be seen from the following reports on authorized annual rate of pay to the railroads at various dates:

October 31, 1916, on weight basis	$62,242,000
November 1, 1916, weight and space combined	65,492,000
July 1, 1917, weight and space combined	58,518,000
September 30, 1917, weight and space combined	56,509,000
December 31, 1917, weight and space combined	55,046,000
March 31, 1918, weight and space combined	53,890,000

Mr. Burleson added: "If there is still doubt in the mind of anyone as to whether the Post Office Department has reduced the cost of carrying the mails on railway lines, let him ask the railroads."

Mr. Burleson also quoted from the annual report of the department a statement that in 1917 the railroads were relieved of service amounting to 11.69 per cent, while the reduction in compensation was at the rate of 11.28 per cent.

Chicago Track Elevation Work to Go On

A settlement has been reached between the Railroad Administration and the Chicago City Council Committee in relation to the track elevation work which has been held up since the railroads were taken over by the government. Under the plan agreed upon, work amounting to $395,000 will be carried out and expenditures aggregating $5,500,000 will be deferred. The work on the Illinois Central's Kensington & Eastern Line is avoided by discontinuing the operation of trains over a portion of the line. Work will also be abandoned temporarily on the Chicago & Western Indiana and on the Rock Island crossing at Cottage Grove avenue, where the work that was contemplated involved a cost of $4,500,000. Track elevation work on the Baltimore & Ohio Chicago Terminal, from 64th Street to 69th Street will be completed at a cost of $200,000. The Englewood Connecting Railroad (Pennsylvania Lines) track elevation, to cost $1,000,000, will be deferred. The completion of the grade separation of Vincennes Road and Eighty Seventh Street with the Chicago, Rock Island & Pacific is authorized, at a cost of $185,000. This work is partly completed and streets are left in a bad condition. No agreement was reached on the Illinois Central's South Chicago branch, involving 40 crossings within a distance of two miles, and that work will probably be deferred.

The Traveling Engineers' Association

The Railroad Administration has authorized the Traveling Engineers' Association to hold the next convention at Chicago, Ill., commencing September 10, 1918. The following are the subjects to be discussed:

(1) Fuel Economy under the following heads (a) Value of present draft appliances; can they be improved to effect fuel economy? (b) Best practice for handling locomotives at terminals to reduce coal consumption. (c) How can enginemen and firemen effect the greatest saving of fuel when locomotives are in their charge? (d) Whether it is most economical to buy cheap fuel, at a low heat value or a higher priced fuel at a greater heat value. (e) The most economical method of weighing fuel when delivered to locomotives, in order that individual records of coal used by enginemen and firemen may be kept. (f) Superheat applied to locomotives as effecting coal consumption.

(2) Engine Failures—causes and remedies, best methods of investigating same, and placing responsibility.

(3) The use of superheat steam in slide valve engines. Drifting, relief and by-pass valves or the absence of any one or all on superheat locomotives equipped with piston valves.

(4) Cab and cab fittings on modern locomotives, from the viewpoint of the engineman.

(5) How can the traveling engineer and general air brake inspector best co-operate to improve and maintain the air brake service?

There will be apportunity for such other matters as may be considered of interest to the association and the railroads under changed conditions.

Express Merger to Be Unscrambled After the War

The contract between the Railroad Administration and the express companies, providing for a consolidation into a single company, was the subject of a prolonged discussion, as noted on page 1466 of this paper. The objections of the postmaster general and the attorney general prevailed, and as a result of the conference held on Tuesday, the following provision was inserted in the contract:

"It is the intention that the provision herein made for carrying on the express transportation business through the agency of a single corporation shall continue in effiect only during the period of federal control; and nothing herein contained shall be construed as sanctioning any combination or merger of the properties or business of the express companies to last beyond that period." Another clause provides that the express companies shall maintain their individual corporate existence and that on the termination of federal control their property or its equivalent shall be reconveyed by the new corporation.

Schweyer's Automatic Train Stop

An automatic train stop invented by D. H. Schweyer, of Easton, Pa., which requires no moving part on the roadway, and in which also, the principal member depending from the locomotive is immovable, is being tried on the Colebrookdale branch of the Philadelphia & Reading, between Bechtelsville, Pa., and Barto, and a public demonstration is to be made at Barto on Sunday, June 23, at 10:30 a. m.

A choke coil depends from the right side of the locomotive, 12¾ in. outside the gage line of the rail, with its bottom face 4½ in. above the top of the rail. This choke coil is in series with a condenser in the circuit of a steam turbine generator carried on the locomotive.

On the track, parallel to the right hand rail and 13 in. outside the gage line is a track armature, about 30 in. long, with its upper surface 2¼ in. above the top of the rail.

As the locomotive passes over a signaling point, the engine member clears the track armature 2¼ in.; and the current in the coil, (a. c.) drops in value 50 per cent. This current is connected to a transformer through an a. c. relay, the armature of which drops when the current is weakened; this opens the internal circuits of two neutral relays, one clear and the other caution; and at the same time a visual cab indicator (lamp) is energized through a back contact.

This process stops every train. But to provide for proceed indications, the leading truck of the locomotive is insulated from the frame, and at the moment that it passes the track armature it is on a short insulated section of track. On the locomotive there is a polarized relay, in a circuit which runs from the insulated truck to the frame of the locomotive and thence to the ground. Through the insulated truck this circuit is energized by a local track battery, the current from which is governed by the condition of the block or blocks ahead, so as to energize the caution relay or the clear relay as may be appropriate.

The plans for use of this stop on an electric railway provide for fixing a receiving coil on the locomotive so that it will hang midway between the two running rails and 3½ in. above the plane of the top of the rails. A track coil, even with the tops of the rails, is momentarily energized by a local battery. The receiving coil passes through the flux produced by the track coil so as to cause the caution or the clear indication at the moment that the choke coil is under the influence of the track armature.

A failure of the local battery, or the breaking of a wire, would result in the application of the brakes and the stopping of the train. The application of the brakes is made by means of slide valves, operated by electro-pneumatic valves, controlled by the relays on the engine.

Provision for service application of brakes is made by means of an expansion reservoir, and the regulation of the degree of reduction of air pressure is effected by varying the amount of expansion space.

The choke coil on the locomotive is normally affected only by the track armature; other structures such as the rails of side tracks, or guard rails, may affect the coil but not in sufficient degree to open the relay. Any structure on or near the track which might possibly affect the circuit on the locomotive can be made harmless in this direction by the use of manganese steel, which is non-magnetic.

Federal Managers

The following table gives a list of the federal and general managers whose appointments have thus far been announced. The names are arranged alphabetically by roads.

ALABAMA & VICKSBURG.—See Southern Railway.

BALTIMORE & OHIO LINES EAST.—A. W. Thompson, Federal Manager, Baltimore, Md.

BALTIMORE & OHIO LINES WEST OF PARKERSBURG AND PITTSBURGH.—C. W. Galloway, Federal Manager, Cincinnati.

BANGOR & AROOSTOOK.—P. R. Todd, Assistant to District Director and General Manager, Bangor, Me.

BOSTON & ALBANY.—H. M. Biscoe, Federal Manager, South Station, Boston, Mass.

BOSTON & MAINE.—B. R. Pollock, Federal Manager, North Station, Boston, Mass.

BUFFALO & SUSQUEHANNA.—E. R. Darlow, General Manager, Buffalo.

BUFFALO, ROCHESTER & PITTSBURGH.—T. F. Brennan, General Manager, Rochester, N. Y.

CAROLINA, CLINCHFIELD & OHIO OF SOUTH CAROLINA.—See Southern Railway.

CENTRAL INDIANA.—See Cleveland, Cincinnati, Chicago & St. Louis.

CENTRAL NEW ENGLAND.—See New York, New Haven & Hartford.

CENTRAL OF GEORGIA.—W. A. Winburn, Federal Manager, Savannah, Ga.

CENTRAL OF NEW JERSEY.—See Philadelphia & Reading.
CENTRAL VERMONT.—J. W. Wardlaw, General Manager, St. Albans, Vt.
CHESAPEAKE & OHIO EAST OF LOUISVILLE, KY., COLUMBUS AND CINCINNATI, OHIO.—G. W. Stevens, Federal Manager, Richmond, Va.
CHESAPEAKE & OHIO NORTHERN.—See Chesapeake & Ohio east of Louisville, Ky., Columbus and Cincinnati, Ohio.
CHESAPEAKE & OHIO OF INDIANA.—G. J. Derbyshire, General Manager, Peru, Ind.
CHICAGO, MILWAUKEE & ST. PAUL.—H. E. Byram, Federal Manager, Chicago.
CHICAGO & NORTH WESTERN.—S. G. Strickland, Federal Manager, Chicago. F. Walters, General Manager.
CHICAGO, INDIANAPOLIS & LOUISVILLE.—H. C. May, General Manager, Lafayette, Ind.
CHICAGO, KALAMAZOO & SAGINAW.—See Michigan Central.
CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—A. W. Trenholm, Federal Manager, St. Paul, Minn.
CINCINNATI, INDIANAPOLIS & WESTERN.—B. A. Worthington, General Manager, Indianapolis.
CINCINNATI, LEBANON & NORTHERN.—See Pennsylvania Lines west of Erie and Pittsburgh.
CINCINNATI NORTHERN.—See Cleveland, Cincinnati, Chicago & St. Louis.
CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—E. M. Costin, Federal Manager, Indianapolis, Ind.
DAYTON & UNION.—See Baltimore & Ohio west of Parkersburg and Pittsburgh.
DELAWARE & HUDSON.—F. P. Gutelius, General Manager, Albany, New York.
DELAWARE, LACKAWANNA & WESTERN.—E. M. Rine, General Manager, New York.
DETROIT & MACKINAC.—J. D. Hawks, General Manager, Detroit, Mich.
DETROIT & TOLEDO SHORE LINE.—J. P. Main, General Manager, Detroit, Mich.
DETROIT, TOLEDO & IRONTON.—J. A. Gordon, General Manager, Detroit, Mich.
DULUTH, SOUTH SHORE & ATLANTIC.—W. W. Walker, Federal Manager, Duluth, Minn.
ERIE.—A. J. Stone, Federal Manager, New York.
GEORGIA SOUTHERN & FLORIDA.—For Federal Manager see Southern Railway. Horace Baker, General Manager, Cincinnati, Ohio.
GRAND RAPIDS & INDIANA.—W. B. Wood, General Manager, Grand Rapids, Mich.
GRAND TRUNK RAILWAY IN NEW ENGLAND.—L. G. Coleman, General Manager, Portland, Me.
GRAND TRUNK WESTERN LINES.—H. E. Whittenberger, General Manager, Chicago.
GREAT NORTHERN.—W. P. Kenney, Federal Manager, St. Paul, Minn.
GULF & SHIP ISLAND.—See Illinois Central.
GULF, MOBILE & NORTHERN.—See Mobile & Ohio.
HOCKING VALLEY.—M. S. Connors, General Manager, Columbus, Ohio.
HUDSON & MANHATTAN.—Kenyon B. Conger, General Manager, New York.
ILLINOIS CENTRAL.—C. M. Kittle, Federal Manager, Chicago.
LAKE ERIE & PITTSBURGH.—See New York Central.
LAKE ERIE & WESTERN.—H. A. Boomer, General Manager, Indianapolis, Ind.
LEHIGH & HUDSON RIVER.—Morris Rutherford, General Manager, Warwick, N. Y.
LEHIGH & NEW ENGLAND.—R. H. Wilbur, General Manager, Philadelphia, Pa.
LEHIGH VALLEY.—F. L. Blendinger, General Manager, New York.
LONG ISLAND.—Ralph Peters, Federal Manager, New York.
LORAIN, ASHLAND & SOUTHERN.—See Pennsylvania Lines west of Erie and Pittsburgh.
LOUISVILLE & NASHVILLE.—W. L. Mapother, Federal Manager, Louisville, Ky.
MAINE CENTRAL.—D. C. Douglass, General Manager, Portland, Me.
MICHIGAN CENTRAL.—E. D. Bronner, Federal Manager, Detroit, Mich.
MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—G. R. Huntington, Federal Manager, Minneapolis, Minn.
MISSISSIPPI CENTRAL.—See Illinois Central.
MOBILE & OHIO.—R. V. Taylor, Federal Manager, Mobile, Ala.
NEW ORLEANS GREAT NORTHERN.—See Illinois Central.
NEW RIVER, HOLSTON & WESTERN.—See Norfolk & Western.
NEW YORK CENTRAL.—P. E. Crowley, Federal Manager, New York.
NEW YORK, CHICAGO & ST. LOUIS.—J. J. Bernet, General Manager, Cleveland, Ohio.
NEW YORK, NEW HAVEN & HARTFORD.—E. J. Pearson, Federal Manager, New Haven, Conn.
NEW YORK, ONTARIO & WESTERN.—J. H. Nuelle, General Manager, Middletown, N. Y.
PHILADELPHIA & READING.—C. H. Ewing, Federal Manager, Philadelphia, Pa.
NORTHERN PACIFIC.—J. M. Hannaford, Federal Manager, St. Paul, Minn.
NORFOLK & WESTERN.—A. C. Needles, Federal Manager, Roanoke, Va.
NORFOLK SOUTHERN.—J. H. Young, Federal Manager, Norfolk, Va.
PENNSYLVANIA LINES EAST OF PITTSBURGH AND ERIE.—Elisha Lee, Federal Manager, Philadelphia.
PENNSYLVANIA LINES WEST OF ERIE AND PITTSBURGH.—G. L. Peck, Federal Manager, Pittsburgh.
PERE MARQUETTE.—F. H. Alfred, Federal Manager, Detroit, Mich.
PHILADELPHIA & READING.—C. H. Ewing, Federal Manager, Philadelphia, Pa.
RUTLAND.—G. T. Jarvis, General Manager, Rutland, Vt.
SOUTHERN RAILWAY.—E. H. Coapman, Federal Manager, Washington, D. C.
SOUTHERN RAILWAY IN MISSISSIPPI.—See Mobile & Ohio.
TOLEDO, ST. LOUIS & WESTERN.—B. C. Stevenson, General Manager, Toledo, Ohio.
TOLEDO TERMINAL RAILROAD.—A. B. Newell, General Manager, Toledo, Ohio.
ULSTER & DELAWARE.—Richard O'Sullivan, General Manager, Kingston, N. Y.
VIRGINIA & CAROLINA.—See Norfolk & Western.
VIRGINIAN.—J. H. Young, Federal Manager, Norfolk, Va.
WHEELING & LAKE ERIE.—H. W. McMaster, General Manager, Cleveland.
YAZOO & MISSISSIPPI VALLEY.—See Illinois Central.

Traffic News

The Public Service Commission of Indiana has authorized an increase in passenger fares on interurban roads from 2 cents a mile to 2½ cents, effective June 30.

The special committee appointed by Director General McAdoo early in the year to formulate a report on uniform rules, descriptions and weights for the three general freight classifications will submit its report to the Interstate Commerce Commission the latter part of next week.

Director General William G. McAdoo says that he strongly endorses the movement launched by the Fuel Administration for the early ordering of coal. The railroad and the fuel administrations are agreed that deliveries can be hastened if the orders are in the hands of the dealers at an early date.

At a recent meeting of the Traffic Club of Pittsburgh, the following officers were elected for the ensuing year: President, J. J. Monks; first vice-president, George A. Buse; second vice-president, W. H. Townsend; third vice-president, R. L. Spencer; secretary, F. A. Layman; treasurer, J. F. Constans.

The embargo which was placed, in May, against less-than-carload shipments of freight to Baltimore, Md., is still in effect, and there are no signs of its discontinuance. The chairman of the Baltimore committee says that consignees continue to be very slow in removing their freight from the stations, and that the widespread congestion in that city has been relieved but little.

Return Load Bureaus, to aid intercity automobile trucks in securing profitable loads in both directions of a round trip, have now been established in New York, Providence, Philadelphia, Syracuse, Buffalo, Cleveland and Detroit, and in fifteen cities and towns of Connecticut and ten in New Jersey. This information is given in an announcement by the National Automobile Chamber of Commerce, which says that there are now in service between New York and Philadelphia about 150 large trucks, one company having a fleet of more than thirty. There are over 50 regular truck routes in Connecticut, and 22 in Maryland.

Shippers of fertilizer have this year made very economical use of freight cars, figures compiled by the National Fertilizer Association showing that the average carload has been over 30 tons, as compared with about 21 tons in 1917. The movement of fertilizer by railroad throughout the country last year is estimated to have been 6,400,000 tons, and this year it has been somewhat larger. Assuming, however, that there has been no increase whatever, it is calculated that, by the heavier loading, the saving this year has been 87,137 cars. The officers of the association have carried on a vigorous campaign to get farmers, buying less than carload lots, to combine their orders for fertilizers so as to enable the factories to send out only full carloads.

Export and Import Rates

The Railroad Administration on June 19 issued a modification of its General Order No. 28 regarding rates on export and import freight. These rates were cancelled by the general order which would have left in effect the domestic rates, but because there are important movements of traffic to and from the Orient which were not covered by domestic commodity rates or on which the application of domestic rates would work undue hardship and disturb trade conditions, eventually curtailing traffic, it was decided after consultation with the commercial interests to publish specific rates to apply on export and import business via the Pacific coast. These rates will be effective June 26 if the tariff can be published by that date. Other export and import rates will be named later. Some of the export carload rates to be published by the Transcontinental Tariff Committee are as follows, from all points in groups D, E, F, G, H, and J, as

defined in R. H. Countiss' tariff I. C. C. 1048, and all other points in the United States east of the Mississippi river via the Pacific coast: Agricultural implements, machinery, oil well supplies, sewing machines, railway equipment, locomotives, freight and passenger cars, lubricating oils, $1.25; cigarettes and tobacco, $1.56½; iron and steel articles from Colorado, 60 cents; Chicago, 75 cents; Pittsburgh and east, 85 cents. The import rates via the Pacific coast include green coffee, 80 cents; chinaware and glassware, $1.87½; rubber, $1.56½; silk, $7.50 (l. c. l.); tea, $1.87½; tin, $1.25, and raw sugar, 87½ cents.

Car Service Office at Chicago

The car service section of the Railroad Administration is to establish at Chicago on July 1 a refrigerator department, for the purpose of facilitating the expeditious and economical handling of refrigerator cars, and W. L. Barnes, assistant manager of the car service section (Washington), will go to Chicago, and will have supervision over refrigerator cars, both those of railroad and those of private ownership. There will also be established, under the charge of Mr. Barnes, a tank-car record office, to deal both with railroad-owned and privately owned tank cars.

Coal Production

Bituminous coal production during the week ending June 8 was the largest in history, according to the weekly report of the Geological Survey. The soft coal produced, including lignite and that made into coke, is estimated at 12,465,000 net tons, an increase over the week of June 1 of approximately 1,900,000 net tons, or 17.8 per cent, and the same increase over week of June 8, 1917. The average daily production is estimated at 2,077,000 net tons, considerably in excess of the 1,791,000 net tons during the week preceding, and 1,789,000 net tons during the same week of the preceding year. Anthracite shipments during the week ended June 8 increased approximately 9,000 carloads or 28.3 per cent. During the week ending June 1, 29.4 per cent of full time output was lost for various causes, of which 8.4 per cent is said to be attributable to car shortage.

Consolidated Ticket Offices

The Eastern Committee on Consolidation of Ticket Offices reports the approximate dates fixed for opening the following union city ticket offices:

New York—31 W. 32nd St.	July 5	Cleveland	July 1
New York—64 Broadway	July 10	Toledo	July 1
New York—114 W. 42nd St.	July 10	Indianapolis	July 10
Philadelphia	June 24	Boston	July 10
Baltimore	June 24	Cincinnati	July 15

The following consolidated offices have been in operation since the dates mentioned:

Rochester	May 1	Brooklyn	June 17
Syracuse	May 1	Reading	June 10
Williamsport	May 1	Wilmington	June 17
Grand Rapids	May 23	Pittsburgh	June 17
Detroit	June 1	Buffalo	June 17
Washington	May 6	Newark	June 17
New York—57 Chambers St. (280 B'way)	June 17	Columbus	June 17
		Dayton	June 17

Taking the Bull by the Horns

New York State's new barge canals have been in operation now more than a month, and the progress toward success has been disappointing, not only to shippers but to the United States Government. In fact, the situation has become so acute that it is proposed by the transportation interests of the State to take some immediate action to prevent the remainder of the season passing without at least demonstrating that the State has not thrown away $154,000,000 without bringing about some improvement over the old canals. With this purpose in view, the shipping interests will hold a convention in Albany on June 26, at which time, it is claimed, the searchlight will be turned upon whatever impediments stand in the way of using the new waterways in expediting shipments between the Great Lakes and the seaboard. Invitations have been sent out to more than a thousand shippers and transportation companies inside the State to be present. It is understood that it is the intention not to invite any State officials to the convention. The shipping men propose to get the business men of the State together and to take the bull by the horns.—*Journal of Commerce, New York.*

Exports Control Committee

An Exports Control Committee to have complete control of the movement of export freight to the ports has been created, consisting of: Major General G. W. Goethals, representing the War Department; Rear Admiral C. J. Peoples, representing the Navy Department; George D. Ogden, general freight agent of the Pennsylvania, representing the Railroad Administration; P. A. S. Franklin, representing the Shipping Control Committee, and D. W. Cooke, vice-president of the Erie, representing the Traffic Executive controlling Allied traffic. It will be the duty of this committee to inform itself: As to the probable amount of freight which must be exported for the prosecution of the war. How this war freight can best be routed through the various ports. How much of other essential export traffic has to be handled. The amount of local traffic necessary for each port. The committee will have authority to select the port to which specified freight shall be transported for trans-shipment overseas for the use of the War and Navy Departments, the Allied governments and others. The committee will also decide the distribution of the combined amount of all exports, as between the various ports, so as to facilitate its handling at, and avoid congestion in, any one port. The headquarters of the committee will be at Washington.

Regulations Respecting Advertising

Edward Chambers, director, division of traffic of the Railroad Administration, has issued a pamphlet of regulations respecting railroad advertising, giving detailed specifications for the construction of time table folders, advertising in the Official Guide, which is to be reduced in size, and for other forms of advertising. The new regulations amplify the circular instructions issued by the regional directors in March and will result in important economies.

For the convenience of the public individual time tables are to be issued by each carrier for free distribution. District time tables may be issued wherever economy or practicability can be secured thereby. Uniformity for each line is to be observed. Folders are to be informative only, claims of superior service to be eliminated. It is suggested that when there is a new issue because of change of time a supply only sufficient to meet the needs of each office for not exceeding 30 days be furnished. While standardization is to be followed as closely as possible any line, the service of which does not warrant a folder of the size specified, may reduce the size to correspond with its requirements. A limited free distribution of local folders is to be allowed in foreign territory, to meet the public need.

Except when required by state law, time table display cards, posters, etc., showing departure of trains, or regular train schedules, designed for posting at line stations, hotels or other public places are not to be used. For the information of the public and ticket agents railroads may issue brief hotel and boarding house lists. The issuance of resort publications has been discontinued until further notice; but when it has been determined that public policy permits they may be issued jointly, but must be informative only and "conservatively descriptive." All work on such publications for the present must be discontinued. Publications informative of the agricultural possibilities of sections not now fully settled may be continued, but where practicable should be joint. Publications intended to exploit limited or other luxurious train service, or other competitive features, are to be discontinued. A limited amount of advertising is permissible when reduced rates are made for special occasions.

Under the general prohibition of anything exploitative is given a list including such things as bill boards, souvenir books, blotters and calendars, wall maps, etc.

Detailed directions are given for representation in the Official Guide, which is to be issued monthly as at present, "at least until such time as it can be arranged to change train schedules less frequently"; and no expense is to be incurred for representation in any other railway guide.

Commission and Court News

Interstate Commerce Commission

The hearing before the Interstate Commerce Commission for the purpose of presenting arguments in the Kansas City Southern valuation case, which was set for June 21 and 22, has been cancelled.

The Interstate Commerce Commission has denied an application of the express companies for a 15 per cent advance in rates, but is expected to issue a decision shortly on the original application for a 10 per cent advance.

The Interstate Commerce Commission has issued the following administrative ruling:

Apparently war conditions will in the near future, because of heavy overseas movement, necessitate the utilization of all our ports and the allocation of vessels in accordance with the capacity of the various ports. It is desirable under these conditions that if a vessel is required to use a port other than the one which she would naturally choose that she shall not be penalized in the cost of bunker coal.

Competition of ports and of carriers has in the past led to varied practices with regard to transportation charges on coal for bunker use. These practices differ as between the ports through which there is a substantial trans-shipment of cargo coal and ports where there is relatively little, if any, such movement.

In view of the existing emergency conditions and the apparent necessities of the future during the continuance of the war, the commission is of opinion that carriers may properly make rates to the ports on coal delivered to vessels and that such rates may be stated as including coal for bunker use. It does not see any justification for lower rates on bunker coal than on cargo coal originating at the same point and delivered to the same vessel.

Interstate Commerce Commission Rate Procedure

The Interstate Commerce Commission has issued the following regarding the procedure to be followed in rate cases during federal control:

"The act for the federal control of railroads and certain recent orders of the Director General have raised questions regarding the status of some of the cases before the commission attacking rates not initiated by the United States Railroad Administration. Inquiry has arisen how far the existence of rates initiated under section 10 of the federal control act will limit or preclude the commission from making lawfully effective orders in proceedings brought prior to such initiation of rates.

"The commission has always lent its active assistance to the settlement of complaints and difficulties between carriers and shippers through informal adjustment. Thousands of complaints and difficulties have been thus disposed of. There seems every reason why under federal control this policy should be continued with reference to complaints involving rates initiated by the United States Railroad Administration. Such action on our part would seem to be mandatory under section 8 of the federal control act, and we intend to accord our advice, assistance and cooperation to that end wherever possible. We understand that the Director General is in accord with this plan of composing difficulties as regards rates initiated by the United States Railroad Administration.

"Failing such efforts to compose difficulties or settle causes of complaint informally, the commission is required under section 10 of the Federal Control Act upon complaint to enter upon a hearing concerning the justness and reasonableness of so much of any order made thereunder as establishes or changes any rate, fare, charge, classification, regulation, or practice of any carrier under federal control. Save for the applicable provisions of this statute the jurisdiction of the commission remains what it has been in the past. The commission has not made and can not make any commitment which will preclude its full exercise of the jurisdiction vested in it.

"A rate initiated by the United States Railroad Administration can not be lawfully altered by the commission, except on complaint after hearing at which the United States Railroad Administration is entitled to be heard. It follows that inasmuch as a new freight rate structure becomes effective June 25, some of these rates might conflict with orders which the commission might enter prescribing rates for the future, even though the orders were entered on the basis of the records in complaints now pending before us. It seems, however, that in certain cases the commission can make lawfully effective orders in proceedings brought prior to such federal initiation of rates. Thus any pending complaint, where the complainant desires to use the finding of the commission as a possible basis for a suit at law for reparation, will be disposed of on the present record so far as that matter is concerned. The same is true of cases pending in so far as they seek reparation for damage from rates unlawfully exacted. Allegations of discrimination may, in certain cases, be disposed of on the records now before us. We do not prejudge the question which has been raised whether by amendment to pleadings in pending cases the United States Railroad Administration may be made a party against which a lawfully effective order may be entered.

"The commission will, as of course, continue consideration and reach conclusions as above indicated in pending cases; where it is possible to make a lawfully effective order without amendment of the pleadings that will be done; and, so far as is possible, the records heretofore build up will be made available for the determination of the issues. The dockets in pending cases will be analyzed, and where it appears that doubt exists whether, without amendment or supplemental hearing, the commission can enter a lawfully effective order, the parties will be so notified.

"Such appropriate changes as the federal control act may render necessary will be made in the commission's rules of practice."

Court News

Defeating Higher Through Rates

In the case of W. H. Settle, et al., vs. the Baltimore & Ohio, the United States Circuit Court of Appeals, Sixth District, has sustained the right of a shipper to make bona fide interstate consignments of freight to an intermediate point, assume the custody thereof and reship under a new bill-of-lading for the purpose of defeating the higher joint through rate. The case was taken up on error from the United States District Court for the Southern District of Ohio, the decision of which was reversed by the higher court. The shipments in question all originated south of the Ohio river and were of two classes: first, those originally consigned to the defendants and billed directly to Oakley, Ohio, which is within the switching district of Cincinnati; second, those originally consigned to others in Cincinnati or elsewhere, purchased by the defendants while in transit and upon arrival in Cincinnati switched to Oakley. It was the defendants' intention, from the time of the shipment, to receive the freight at Madisonville, Ohio. The interstate rate from the point of origin to Madisonville in each case exceeded the sum of the interstate rate to Oakley and the local rate from Oakley to Madisonville. Judge Knappen, in his opinion, says that in none of the cases cited by the plaintiff was the freight actually delivered to the consignee previous to reshipment. None of the shipments involved the payment of actual demurrage charges for delay before reshipping. All of the cases seem to have turned expressly or impliedly upon the question of continuity of movement actual or constructive. The character of the shipments from Oakley to Madisonville, the court says, is to be ultimately tested by the consideration whether or not there was an actual delivery of the shipment in good faith to the consignee at Oakley and actually a new and independent shipment therefrom by defendant to Madisonville while the lumber was physically present and in his possession. A shipment thus delivered, possessed and independently reshipped is not, as a matter of law, converted into an interstate shipment by the existence of an original and continuing intention to so reship in intrastate commerce for the saving of expense. In this case the shipper of the freight was required to go to the trouble of accepting delivery and making reshipment, perhaps submitting to delays and perhaps to unloading and reloading and possibly to paying demurrage. He also lost the benefit of the liability of the initial carrier.—W. H. Settle, et al, vs. Baltimore & Ohio. Decided May 7, 1918.

Equipment and Supplies

Cars and Locomotives For Lines in France

The United States Government is expected to place large orders shortly for additional cars and locomotives for service on the military railway lines in France. General Pershing has cabled to Washington requirements for locomotives, cars and steel which will greatly increase the orders already placed by S. M. Felton, director general of military railways, which include about 30,000 cars and 2,000 locomotives. The number of cars and engines wanted has not been given out, but it is understood that it is so large as to cause some perplexity on the part of the authorities in charge of the apportionment of the steel supply.

390 Locomotives Ordered

The order for 390 additional locomotives, mentioned last week, as about to be placed by the Railroad Administration, has now been placed.

Car and Locomotive Specialties

The Central Advisory Purchasing Committee has announced the following additional awards for specialties for the government cars and locomotives:

Locomotives

Metallic connection between engine and tender	400 Franklin Ry. Supply Co. 385 Barco Mfg. Company. 240 Greenlaw Mfg. Co.
Springs	To be purchased by builders.
Throttle valves	All Chambers Valve Company.
Rolled steel wheels	Forged Steel Wheel Company. Standard Steel Works Company.
Yokes for tenders (cast steel)	All, Buckeye Steel Castings Co.

Cars

Journal bearings	8,000 Haskell & Barker Car Co. 10,000 Bostwick-Lyon Bronze Co. 11,000 Southern Brass Company. 20,000 Keystone Bronze Company. Balance of order to be placed later.
Wheels (steel)	3,000 Midvale Steel & Ordnance Co. 7,500 Forged Steel Wheel Company. 2,500 Carnegie Steel Company.
Wheels (cast iron)	126,000 Griffin Wheel Company. 13,000 Brown Company. 13,000 Buffalo Car Wheel Fdy. Co. 16,000 Bass Foundry & Mach. Co. 16,000 New York Car Wheel Wks. 20,000 National Car Wheel Company. 8,000 Ramapo Iron Works. 8,000 Southern Wheel Co. 4,000 Standard Steel Works Co. 8,000 Albany Car Wheel Co. 4,000 Louisville Car Wheel & Ry. Sup. Co. 56,000 Pressed Steel Car Company. 248,000 American Car & Foundry Company. 64,000 Haskell & Barker Car Co. 32,000 Mt. Vernon Car Mfg. Company. 16,000 Lenoir Car Works.
Door fixtures	25,000 single sheathed box. Camel Company. 25,000 double sheathed box.. Union Metal Products Company.
Door operating mechanism	Composite gondola and 55 ton hopper cars. Combination of car builders design with Enterprise safety lowering device.
Roofs	17,000 Murphy, Standard Ry. Equipment Co. 16,500 Chicago-Cleveland Car Roofing Co. 16,500 Hutchins Car Roofing Company. 10,000 American Steel Foundries.
Springs	5,250 Crucible Steel Co. 5,500 Union Spring & Mfg. Co. 5,350 Pittsburgh Spring & Steel Co. 2,400 Ft. Pitt Spring & Mfg. Co. 52,000 Railway Steel Springs Co. 3,000 W. G. Mitchell Spring Works. 7,500 Pressed Steel Car Company. 7,500 Standard Steel Car Company. 1,500 Keith Ry. Equipment Company.
Angle cock holders	All Railway Devices Company.
Ratchet brake levers	For composite gondolas and 55 ton hoppers 25,000 Robert H. Blackall. 20,000 Railway Devices Company.

Orders for the plates, bars and shapes for the cars and locomotives have been distributed among the steel companies.

One Car Completed

Although all of the specialties had not yet been ordered, Director General McAdoo's office announced on June 19 that he had just been notified by President Woodin, of the American Car & Foundry Company, that the first of the 33,000 freight cars for which that company held the contract had been completed, and that work on the entire order is progressing. The letting of this contract was announced on April 26.

This is a sample or model car built for inspection purposes and does not necessarily conform to complete final specifications.

For the purpose of facilitating delivery of cars and locomotives ordered, Central Advisory Purchasing Committee has established a procurement section which will follow up and expedite the delivery by keeping in close touch with progress of work at different plants and by rendering such assistance as possible in the procurement and delivery of materials needed. This section will be in charge of H. C. Peare. His office is at Washington, and he succeeds the Advisory Committee on Materials.

Machinery and Tools

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has issued an inquiry for four 36-in. x 12-ft. engine lathes, four 24-in. x 10-ft. engine lathes, four 42-in. boring mills with bar head, three 30-in. planers, two air compressors of 1,500 cu. ft. per min. capacity, and one of 500 cu. ft. per min. capacity.

Track Specialties

THE NORFOLK & WESTERN is inquiring for 8,000 kegs of spikes.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 1,700 kegs of spikes.

THE PENNSYLVANIA LINES have ordered 3,000 kegs of spikes of two Pittsburgh companies.

THE BALTIMORE & OHIO has placed an order with a Pittsburgh concern for 1,000 kegs of spikes.

LIGHT RAILWAYS IN PRUSSIA.—The aggregate mileage of light railways in Prussia at the end of March, 1917, was about 6,705 miles as against about 6,659 miles at the end of the previous fiscal year. The gages of these lines varied between 2 ft. and the German standard gage (4 ft. 8½ in.). The capital invested at the end of March, 1917, was nearly $185,000,000.

THE RAILWAY BOARD OF INDIA has sanctioned the following surveys by the Darjeeling-Himalayan Railway: A meter gage line from Oslampur to Siliguri, via Titalia, a distance of about 36 miles; a meter gage line from Titalia or Ramgunge to Jalpaiguri, a distance of about 22 miles; for converting the Kissengunge-Islampur line from the 2 ft. to the meter gage, a distance of about 18 miles; and for a 2-ft. gage line from Islamour to Dinajpur via Lahiree Hat with a branch from Lahiree Hat to Haldibari, a distance of about 89 miles.

THE URUGUAYAN RAILWAY PURCHASE.—Private advices received from Buenos Aires state that the bill pending in the Uruguayan Congress, which would authorize the government to purchase the Uruguayan Central Railway and a number of public utilities from British interests, provides for the issuance of government bonds to the amount of 65,000,000 pesos, or $67,000,000 in American money. In order to insure the success of the flotation, the measure contains the rather unusual feature of compelling exporters to receive 25 per cent of the selling price of their goods in these bonds. It is explained that capital is comparatively scarce in Uruguay and, inasmuch as those engaged in the export trade are the most prosperous class in the country at the moment, it is the intention of the government to conscript a part of their newly acquired wealth in the sense of forcing them to subscribe to the bonds.—*Broad Street Gossip in the Wall Street Journal.*

Supply Trade News

W. M. Bosworth has resigned as mechanical engineer of the Norfolk Southern to go into the engineering department of the Underfeed Stoker Company, Chicago, Ill.

Charles P. Wright, sales representative of the American Brake Shoe & Foundry Company, at Chicago, has been appointed assistant to the vice-president, with headquarters at Chicago, effective June 1.

The directors of the Pullman Company on June 10 elected **John F. Kane** secretary, succeeding **A. S. Weinsheimer,** deceased, and **Charles S. Sweet,** formerly chief clerk in the president's office, was elected assistant secretary, succeeding Mr. Kane.

The Q & C Company, of New York and Chicago, announces the appointment of the General Supply Company, Ltd., of Canada (358-360 Sparks street, Ottawa, Canada, with branch offices at Montreal, Winnipeg and Vancouver), as sole representatives in Canada.

David T. Hallberg, whose promotion to district sales agent of the P & M Company, with headquarters at Chicago, was announced in these columns on June 14, was born at Ottumwa, Iowa, on September 11, 1885. After completing his education in the public schools in that city, he went to Chicago in 1901, and was there employed in the printing industry until he entered the passenger and advertising department of the Atchison, Topeka & Santa Fe, in 1905. Later he was appointed western representative of the Santa Fe Employees' Magazine, and remained in that position until he entered the service of the P & M Company as material inspector in May, 1910. Shortly after that he became western representative and in January, 1918, he came to Chicago as sales representative, which position he held until his present promotion to district sales agent, as mentioned above.

D. T. Hallberg

G. H. Corse, Jr., has resigned as traffic manager of G. Amsinck Company, New York, to become traffic manager of the Robertson-Cole Company, of New York, general exporters of motor cars, steel, etc., with headquarters at San Francisco. Until a few months ago, Mr. Corse was foreign passenger agent of the Union Pacific System.

The degree of Doctor of Engineering was conferred upon **Walter V. Turner,** manager of engineering for the Westinghouse Air Brake Company, by the University of Pittsburgh at the annual Commencement, in recognition of his valuable services to the engineering profession and to humanity. Mr. Turner is considered the foremost pneumatic engineer in the world, and has over four hundred (400) inventions, covered by U. S. patents, in use on most railways of the world and in many large industrial plants.

The Universal Draft Gear Attachment Company, Chicago, has joined with **John T. Llewellyn,** president of the Chicago Malleable Castings Company and associates in the purchase of the Harvey (Ill.) plant of the Whiting Foundry & Equipment Company, just west of the tracks of the Baltimore & Ohio Chicago Terminal. The stated consideration is $75,000. The property includes a one-story building, about 400 by 125 ft., and two or more acres of land. The plant will be used mainly for the manufacture of steel castings for railroad cars. This transaction disposes of the smaller of two pieces of property of the Whiting Foundry & Equipment Company at Harvey.

Stanley W. Midgley, whose appointment as western representative in charge of railroad sales of the Liberty Steel Products Company, at Chicago, was announced in the *Railway Age*, on June 14, was born at Chicago in 1875. After completing his education at the Lewis Institute (Chicago) he entered the sales department of the Great Western Cereal Company, having charge of the wholesale trade, with headquarters at Chicago. From 1902 to 1906, Mr. Midgley was general sales representative of the National Car Coupler Company, at Chicago, and from 1906 to 1914 he was western representative and western sales manager of the Curtain Supply Company, in the same city. Subsequently, he became general sales manager of the Acme Supply Company, with headquarters in Chicago, and remained with that company until his recent appointment as mentioned above.

S. W. Midgley

The Westinghouse Electric & Manufacturing Company has purchased the property, business and good-will of the Kruntz Manufacturing Company, Inc., Brooklyn, N. Y., manufacturers of safety and semi-safety electrical and other devices, such as auto-lock switches, distribution panels, switchboards, floor boxes, bushings, etc. The supply department of the Westinghouse Electric & Manufacturing Company will act as exclusive sales agent for the products of the Krantz Manufacturing Company, Inc., Brooklyn, N. Y., continued under its present name. **H. G. Hoke,** of the Westinghouse Electric & Manufacturing Company, will represent the supply department at the Krantz factory.

Frank W. Edmunds has been appointed general eastern sales manager of the Schroeder Headlight & Generator Company, of Evansville, Ind., with offices at 30 Church street, New York. Mr. Edmunds, like many of the prominent men allied with the railway supply industry, began his business career as an office boy. His first employer was the man who put up the money for and built the famous "Monitor" of Civil War days, John A. Griswold, president of John A. Griswold & Co. With this company Mr. Edmunds stayed until it became the Troy Steel Company and then some years later liquidated. In the meantime he had been made secretary, treasurer and general sales manager. He then became secretary of the Q & C Company at Chicago, acting also as western representative of the Pennsylvania Steel Company. He resigned from this position to become associated with the Dressel Railway Lamp Works, of New York, with which company he has been for 15 consecutive years, resigning as sales manager to accept the posi-

F. W. Edmunds

tion mentioned above. The change becomes effective June 15. Mr. Edmunds served for years on various committees of the Railway Supply Manufacturers Association and other associations, and is now the secretary-treasurer of the Signal Appliance Association.

George M. Coale, whose election as vice-president of the Duncan Lumber Company, with headquarters at Chicago, was announced in the *Railway Age* on June 14, was born at Gosport, Ala., on May 30, 1885. In 1903 he entered the employ of the Keith Lumber Company, at Voth, Tex., as a clerk, remaining with that company until 1905, at which time he was appointed assistant sales manager of the Continental Lumber Company at Houston, Tex. The latter part of the following year he was elected secretary and sales manager of the same company. In 1909 he became northern sales manager for the Kirby Lumber Company, with headquarters at Chicago, with which company he remained until 1911, when he returned to the Continental Lumber Company, as vice-president. He retained that position until his recent election as vice-president in charge of railway sales of the Duncan Lumber Company of Portland, Ore.

D. F. Crawford, who recently resigned as general manager of the Pennsylvania Lines West of Pittsburgh, has been elected vice-president of the Locomotive Stoker Company, with headquarters at Pittsburgh, Pa. When in railway service, Mr. Crawford obtained extensive experience in both mechanical and executive positions. He was born at Pittsburgh December 4, 1864, and attended the city and private schools and also the Pennsylvania Military College. He entered the service of the Pennsylvania System in July, 1882, in the freight department, transferring to the Altoona shops in December, 1885, as a special apprentice. From 1889 to February 1, 1892, he was an inspector in the test department. In February, 1892, he was appointed assistant master mechanic of the Fort Wayne shops of the Pennsylvania Lines West of Pittsburgh. From July 1, 1895, to November 1, 1899, he was assistant to superintendent of motive power of the Northwest System of the Pennsylvania Lines West and on the latter date was made superintendent motive power of the same system, where he remained until August 1, 1903, when he was appointed general superintendent of motive power of the Pennsylvania Lines West of Pittsburgh. On January 1, 1917, he was promoted to general manager of the Lines West. Mr. Crawford was president of the Master Mechanics' Association in 1913, and in 1915 he was president of the Master Car Builders Association. Since 1903, he has devoted much time and attention to the use and development of mechanical stokers for locomotives—and during this period developed the Crawford underfeed stoker, which is in extensive use on the Pennsylvania Lines West.

D. F. Crawford

Conference of Allied Manufacturers and Publishers

Representatives of the business and editorial departments of a large number of business papers were the guests at luncheon at the University Club in Chicago on June 17 of the manufacturing concerns associated with the Allied Construction Machinery Corporation. The occasion was a conference for the discussion of the American export situation after the war and of the means by which the publishers and the manufacturers can co-operate for their mutual benefit.

Announcement of the purpose of the conference was made by D. H. Nichols, managing director of the Allied Publicity Bureau, and the toastmaster was S. T. Henry, vice-president of the Allied Construction Machinery Corporation. The speakers and their subjects were: F. A. Smythe, president of the Thew Automatic Shovel Company, "Publicity in the Sales Program"; W. T. Beatty, president, Austin Manufacturing Company, "Problems Encountered in Advertising Road Machinery"; E. J. Mehren, vice-president, McGraw-Hill Publishing Company, "The Publisher's Ability to Serve"; Charles F. Lang, president, Lakewood Engineering Company, "Visualizing Sales Through Publicity"; W. S. Kies, vice-president, American International Corporation, "Foreign Trade and American Manufacturers"; James H. Foster, president, Hydraulic Pressed Steel Company, "Manufacturing Efficiency in War Times"; Carl A. Luster, president, Clyde Iron Works, "The Value of Quality in Direct Appeal"; W. H. Taylor, president, Iron Age, "Conditions of the Iron and Steel Trade Now and After the War."

The Allied Construction Machinery Corporation was organized chiefly to further export trade, and is now studying conditions both at home and abroad with a view to promoting such trade for the companies associated with it after the war. The conference with the publishers in Chicago was the first of a series of conferences which the Allied Manufacturers will hold with different classes of persons and concerns with which they do business. Following the conference in Chicago on Monday, the manufacturers, accompanied by a number of the publishers, started on a tour of inspection of the plants of the allied manufacturers which will take them to Aurora, Ill.; Milwaukee, Wis.; Duluth, Minn.; Colfax Springs and Newton, Iowa; Cleveland, Ohio, and Lorain. The final conference between the manufacturers and publishers will be held at the Cleveland Athletic Club on June 28. The plants to be visited are those of the companies whose presidents appeared as speakers at the luncheon on Monday and also of the C. H. & E. Manufacturing Company; the Sterling Wheelbarrow Company, and the Barber-Greene Company. The purpose of the inspection trip is to so familiarize the publishers with the plants and products of the manufacturers as to enable the former to give the manufacturers better service through their advertising columns.

Trade Publications

Wrought Iron Pipe.—A photomicrograph showing a section of pipe magnified 60 diameters is an interesting feature of a folder recently issued by the A. M. Byers Company, Pittsburgh, Pa. The reason for the rust resisting properties of wrought iron is clearly brought out, and records of installation of Byers pipes are cited in the folder.

Swedish Purchase of German Rails.—The Swedish Railway management has entered into a fully guaranteed agreement with the German Steel Trust for the delivery of 80,000 tons of rails. One-third of the deliveries is to be made in each of the years 1918, 1919, and 1920. Payment is to be made by the deposit of Swedish crowns in the German Reichsbank, and about half of the amount, reckoned at 11,500,000 crowns ($3,105,000) is to be paid immediately.—*Commerce Reports.*

Exemptions for British Railwaymen.—A question in the English Parliament on the exemptions from military service granted by railway companies to railway employees received this answer: All railway men are protected from military service under arrangements originally made between the War Office and the Railway Executive Committee and continued by the Ministry of National Service. The release of railway employees for military service is carried out under the instructions of the Railway Executive Committee, and in agreement with the men's representatives. By this agreement, men are released in order of medical grade, age, marital conditions, and number of children. Any man considering himself to be released out of his turn has the right of appeal to an independent committee appointed by the Board of Trade, and accepted by the Railway Executive Committee and the men's unions. Railway men have the same rights of appeal to tribunals on other than occupational grounds as are enjoyed by other men.

Railway Financial News

ALABAMA, TENNESSEE & NORTHERN.—The reorganization committee of which G. C. Van Tuyl, Jr., president of the Metropolitan Trust Company of New York, is chairman, has adopted a reorganization plan for this company. It provides for the issuance of (1) $3,500,000, 30-year 6 per cent prior lien gold bonds, $850,000 of which are for the cash requirements of the plan, the rest to be reserved for general corporate purposes; (2) $2,116,000 general (2d) 30-year mortgage gold bonds; (3) $1,700,000 6 per cent preferred stock at par of which $1,527,600 will be presently issuable under the plan; (4) $2,500,000 common stock at par of which $2,424,600 (v. t. c.) will be presently issuable under the plan. The new common stock will be assigned to George C. Van Tuyl, Jr., Louis V. Bright, George E. Warren, James C. Colgate, John T. Cochrane and H. A. Smith, to be jointly held by them and their respective successors as voting trustees for five years with the right either to terminate the trust at an earlier date; or to continue it for a further period of three years in the event that during the said period of five years the full rate of interest of 6 per cent per annum shall not have been paid on the general mortgage bonds for at least three years of said period. The plan gives the terms of exchange for existing securities and holders are advised to deposit their holdings with the Metropolitan Trust Company, 60 Wall street, New York City, on or before July 12.

BALTIMORE & OHIO.—An application has been filed by this company with the Ohio Public Utilities Commission for permission to issue $20,000,000 5 per cent bonds. This action is understood to forecast an early request by the company for funds from the Railroad Administration to meet maturing equipment obligations and to provide for improvements recommended by the Railroad Administration.

BOSTON & MAINE.—See editorial comments elsewhere in this issue.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—See editorial comments elsewhere in this issue.

DENVER & RIO GRANDE.—William Salomon & Co. on the steps of the County Court House of New York County Thursday bid $4,000,000 for the right, title and interest of the Denver & Rio Grande in the stock of the Utah Fuel Company, which has a par value of $10,000,000. The banking firm acted on behalf of the Western Pacific Railroad, which has a 95 per cent interest in the $38,000,000 judgment against the Denver & Rio Grande, which was obtained several months ago by the Equitable Trust Company as trustee of the old Western Pacific first mortgage bonds. The remaining 5 per cent interest is held by the old Western Pacific first mortgage bondholders who did not join in the reorganization. The sale was conducted under a protest of the Bankers Trust Company, acting as trustee for the first and refunding bondholders of the Denver & Rio Grande. The bid made by Salomon & Co. places a nominal value of $12,300,000 on the Utah Fuel property, inasmuch as the $4,000,000 price was paid for the equity in the property over and above the $2,300,000 Utah Fuel bonds outstanding and the $6,000,000 cash which must be paid to the Guaranty Trust Company to redeem the stock which is pledged with it as trustee, as collateral security for the Rio Grande Western consolidated mortgage. The Bankers Trust Company's protest served notice that that company, acting as trustee under the Denver first and refunding mortgage, would at the proper time take such action as may be appropriate to protect the first and refunding bondholders' interest in the Utah Fuel stock.

ERIE.—This company has applied to the New York Public Service Commission for permission to issue $12,500,000 6 per cent series B mortgage bonds for general capital expenditures.

PHILADELPHIA & READING.—William K. Vanderbilt, Jr., and C. E. Dilkes have been elected directors to succeed Alfred H. Smith and William L. Kinter, respectively, resigned.

WESTERN PACIFIC.—See Denver & Rio Grande.

Railway Officers

Executive, Financial, Legal and Accounting

T. H. Gatlin, assistant to vice-president of the Southern Railway, has been appointed assistant to president, with headquarters at Washington, D. C.

A. M. Schoyer, resident vice-president of the Pennsylvania Lines West of Pittsburgh, with office at Chicago, has been transferred to Pittsburgh, Pa., and the Chicago office has been abolished.

Samuel Rea, president of the Pennsylvania Railroad and subsidiary companies, has been elected also president and director of the Long Island, to succeed **Ralph Peters,** who has resigned to become federal manager of the Long Island.

E. S. Jouett, general attorney of the Louisville & Nashville, has been appointed general counsel; and **J. H. Ellis,** secretary has been appointed treasurer, also treasurer of the Louisville, Henderson & St. Louis, both with headquarters at Louisville, Ky.

Alexander R. Lawton, vice-president of the Central of Georgia, with office at Savannah, Ga., has been elected president of the Wadley Southern, to succeed **William A. Winburn,** resigned to accept service with the United States Railroad Administration.

George M. Shriver, vice-president of the Baltimore & Ohio, has been elected vice-president and a director also of the Washington Terminal Company, succeeding **A. W. Thompson,** who has been appointed federal manager of the Baltimore & Ohio eastern lines.

L. S. Smith, assistant treasurer of the Texas & Pacific, has been appointed treasurer for the receivers of that company, with headquarters at Dallas, Tex., effective June 2. **C. W. Veitch,** secretary and treasurer, with headquarters at New York, has been retained as secretary at New York.

H. T. Wickham, vice-president and general counsel of the Chesapeake & Ohio, is now general counsel; **L. F. Sullivan,** controller, has been appointed general auditor; **J. W. Nokely,** general auditor, has been appointed assistant general auditor, and **J. A. Hancock,** assistant treasurer, has been appointed treasurer; all with headquarters at Richmond, Va.

A. H. Plant, comptroller of the Southern Railway, has been appointed comptroller of the same road, also the Georgia Southern & Florida, the Alabama & Vicksburg, the Carolina, Clinchfield & Ohio, and the Carolina, Clinchfield & Ohio of South Carolina. The following assistants to vice-president of the Southern have been appointed on the same roads: **G. W. Taylor,** staff officer, transportation; **J. Hainen,** staff officer, mechanical; **F. W. Brown,** staff officer, headquarters; **H. H. Laughton,** staff officer, materials and supplies; **W. H. Gatchell,** staff officer, loss and damage prevention; **Alex. Grant,** mail traffic manager, and **W. M. Netherland,** manager dining cars. **Randall Clifton,** freight traffic manager, has been appointed traffic manager, and **E. H. Shaw,** freight traffic manager, has been appointed assistant traffic manager. All with headquarters at Washington, D. C.

Operating

Ralph Peters, president of the Long Island, has been appointed federal manager, with office at New York.

W. P. Kenney, president of the Great Northern, has been appointed federal manager, with headquarters at St. Paul, Minn.

W. J. Harahan, president of the Seaboard Air Line, with headquarters at Norfolk, Va., has been appointed federal manager.

A. T. Hardin, vice-president of the New York Central, has been appointed assistant regional director, Eastern Railways, with office at New York city.

H. L. Ingersoll, assistant to the president of the New York Central, has been appointed mechanical assistant in the office of the eastern regional director, New York city.

J. M. Hannaford, president of the Northern Pacific, has been appointed federal manager, with headquarters at St. Paul, Minn.

H. E. Byram, president of the Chicago, Milwaukee & St. Paul has been appointed federal manager, with headquarters at Chicago.

B. A. Worthington, president of the Cincinnati, Indianapolis & Western, has been appointed general manager, with office at Indianapolis, Ind.

T. F. Brennan, vice-president of the Buffalo, Rochester & Pittsburgh, has been appointed general manager, with headquarters at Rochester, N. Y.

Richard O'Sullivan, superintendent of the Ulster & Delaware, has been appointed general manager, with headquarters at Kingston, N. Y.

George E. Evans, fourth vice-president of the Louisville & Nashville, has been appointed staff officer—operation, with headquarters at Louisville, Ky.

R. H. Wilbur, vice-president and general manager of the Lehigh & New England, has been appointed general manager, with office at Philadelphia, Pa.

J. D. Hawks, vice-president and general manager of the Detroit & Mackinac, has been appointed general manager, with headquarters at Detroit, Mich.

H. C. May, superintendent of motive power of the Chicago, Indianapolis & Louisville, has been appointed general manager, with office at La Fayette, Ind.

J. H. Nuelle, general superintendent of the New York, Ontario & Western, has been appointed general manager, with headquarters at Middletown, N. Y.

H. W. McMaster, vice-president and general manager of the Wheeling & Lake Erie, has been appointed general manager, with office at Cleveland, Ohio.

Morris Rutherford, vice-president and general manager of the Lehigh & Hudson River, has been appointed general manager, with headquarters at Warwick, N. Y.

J. J. Bernet, president and general manager of the New York, Chicago & St. Louis, has been appointed general manager, with headquarters at Cleveland, Ohio.

G. R. Huntington, general manager of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed federal manager, with headqarters at Minneapolis, Minn.

E. M. Rine, vice-president and general manager of the Delaware, Lackawanna & Western, has been appointed general manager, with headquarters at New York.

R. N. Hudson, president and general manager of the Louisville, Henderson & St. Louis, has been appointed general superintendent, with headquarters at Louisville, Ky.

C. H. Erwing, vice-president of the Philadelphia & Reading, has been appointed federal manager of the same road, and the Central of New Jersey, with office at Philadelphia, Pa.

Kenyon B. Conger, assistant secretary, assistant treasurer, and real estate agent, of the Hudson & Manhattan, has been appointed general manager, with office at New York.

A. M. Darlow, assistant to president and superintendent of motive power, of the Buffalo & Susquehanna, has been appointed general manager, with headquarters at Buffalo, N. Y.

J. S. Spelman has been appointed general superintendent of the Western Pacific, with headquarters at San Francisco, vice **E. W. Mason,** resigned to accept appointment as major of engineers, U. S. Reserve.

R. V. Taylor, federal manager of the Mobile & Ohio, and the Gulf, Mobile & Northern, has been appointed federal manager also of the Southern Railway in Mississippi, with headquarters at Mobile, Ala.

D. F. Crawford, general manager of the Pennsylvania Lines West of Pittsburg, has resigned to become vice-president of the Locomotive Stoker Company, with headquarters at Pittsburg, Pa., as mentioned in another column.

C. M. Kittle, federal manager of the Illinois Central, the Yazoo & Mississippi Valley and the Gulf & Ship Island, has been appointed federal manager also of the Mississippi Central and the New Orleans Great Northern, with headquarters at Chicago, Ill.

James Shannon, trainmaster of the Northern Pacific, has been appointed superintendent of the Pasco division, with headquarters at Pasco, Wash., vice **W. C. Sloan,** who has been granted leave of absence to enter military service overseas.

L. C. Gilman, president of the Spokane & Island Empire and of the Spokane, Portland & Seattle, has been appointed district director of the Puget Sound district, in charge of railroad operation in Washington and Oregon, with headquarters at Seattle, Wash.

M. J. Gormley, operating assistant to regional director, western railroads, has been appointed assistant regional director of the northwestern railroads, and **J. G. Woodworth,** traffic assistant in western region, has been appointed traffic assistant in northwestern region.

Ira L. Anderson has been appointed trainmaster of the Cherokee, Sioux Falls and Onawa districts of the Illinois Central, with headquarters at Cherokee, Iowa, succeeding **William E. Ausman,** resigned to enter military service, effective June 7.

W. L. Mapother, federal manager of the Louisville & Nashville and the Louisville, Henderson & St. Louis, with headquarters at Louisville, Ky., has been appointed federal manager also of the Nashville, Chattanooga & St. Louis and the Tennessee Central.

M. J. Wise, assistant to general manager of the Mobile & Ohio, with office at Mobile, Ala., has been appointed staff officer—operation, of the Mobile & Ohio and the Gulf, Mobile & Northern. The staff officer will assist the federal manager in all details of operation.

Jas. Shannon, trainmaster of the Northern Pacific, at Spokane, Wash., has been promoted to superintendent of the Pasco division, with headquarters at Pasco, Wash., succeeding **W. C. Sloan,** who has been granted leave of absence to go into military service overseas.

Stanley W. Crabbe, whose appointment as superintendent of the Canadian Pacific, with headquarters at Schreiber, Ont., has already been announced in these columns, was born on August 9, 1885, at Teeswater, Ont., and was educated in the public and high schools. He began railway work on May 25, 1903, with the Canadian Pacific as a trackman, and has been in the continuous service on that road ever since. He served consecutively as telegraph operator, yard agent and terminal agent, until his recent appointment as superintendent of the same road with headquarters at Schreiber as above noted.

S. W. Crabbe

E. T. Lamb, president of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., has been appointed federal manager of the Atlanta, Birmingham & Atlantic, the Atlanta & West Point, the Western Railway of Alabama, the Charleston & Western Carolina and the Frisco lines east of the Mississippi river.

A. W. Trenholm, vice-president and general manager of the Chicago, St. Paul, Minneapolis & Omaha, has been appointed federal manager, with headquarters at St. Paul, Minn. The terminals of all the railroads at Minneapolis and St. Paul, including Minnesota Transfer, will be under the jurisdiction of Mr. Trenholm.

On account of the consolidation of the Evansville & Indianapolis with the Chicago & Eastern Illinois for operating purposes under federal management, the positions held by **C. B. Falley,** general superintendent of the former road, at Terre Haute, Ind., and **R. E. Farmer,** assistant superintendent at the same point, have been abolished.

W. W. Walker, vice-president and general manager of the Duluth, South Shore & Atlantic, has been appointed federal manager, with headquarters at Duluth, Minn. Mr. Walker, in addition to his duties as federal manager of the D., S. S. & A., will have charge of the ore, coal and grain traffic to and from Lake Superior and upper Lake Michigan ports.

E. D. Leavitt, trainmaster of Western division of the Southern Pacific, has been appointed assistant superintendent of the Stockton division, with headquarters at Stockton, Cal., vice **W. M. Stillman,** who has accepted service with the government, and **F. E. Yoakum** has been appointed trainmaster of the Western division, with office at Oakland Pier, Cal., vice Mr. Leavitt.

Horace Baker, general manager of the Southern Railway, lines west, has been appointed general manager of the same lines, the Georgia Southern & Florida, and the Alabama & Vicksburg, with headquarters at Cincinnati, Ohio. **W. N. Foreacre,** general manager of the Southern Railway, lines east, is general manager of the same lines, also of the Carolina, Clinchfield & Ohio, and Carolina, Clinchfield & Ohio of South Carolina, with headquarters at Charlotte, N. C.

J. G. Cowan, assistant superintendent of the Galena division of the Chicago & North Western at Chicago, has been promoted to superintendent, with the same headquarters, in place of **B. E. Terpning,** transferred to the Wisconsin division at Chicago, succeeding **G. W. Dailey,** promoted to assistant general superintendent at Huron, S. D. **J. Leppla,** assistant division superintendent at Chadron, Neb., has been transferred to the Galena division at Chicago, to take the place of Mr. Cowan.

W. A. Baldwin, general superintendent of the Erie, lines west, with office at Youngstown, Ohio, has been appointed transportation assistant, with jurisdiction over transportation matters heretofore in charge of the general manager; **E. T Campbell,** assistant general manager at New York, has been appointed traffic assistant with jurisdiction over traffic matters. **R. E. Woodruff,** superintendent of transportation, at Youngstown, has been appointed general superintendent, lines west, vice **W. A. Baldwin,** promoted; **A. E. Wallace,** general superintendent at Chicago, has been appointed assistant general superintendent, lines west, and **C. D. Ward,** special agent, at Jersey City Terminal, has been appointed general agent at Chicago (with jurisdiction over Chicago and Hammond terminals), vice **F. G. Lantz,** transferred. The jurisdiction of the general superintendent of lines west is extended over the Marion division, and the offices of the general superintendent at Chicago and the superintendent of transportation, lines west, are abolished.

Traffic

D. M. Goodwyn, general freight agent, of the Louisville & Nashville, has been appointed assistant freight traffic manager, with headquarters at Louisville, Ky.

Francis LaBau, traffic manager of the New York Central (Buffalo and east thereof), has been appointed traffic assistant to the regional director, Eastern Railways, with office at New York city.

G. H. Ingalls, traffic manager of the New York Central Railroad, lines west of Buffalo, has been appointed resident traffic assistant to the regional director, Eastern Railways, with office at Chicago.

George W. Williams, commercial agent of the Chicago, Rock Island & Pacific, at Detroit, Mich., has been appointed division freight agent, with headquarters at Des Moines, Iowa, to succeed **Albert W. Eberhart,** deceased.

F. L. Norman, commercial agent of the Grand Trunk at Seattle, Wash., has entered the service of the Grand Trunk Pacific Coast Steamship Co., Ltd. The Seattle and Portland offices of the Grand Trunk have been abolished, effective June 1.

F. M. Whitaker, vice-president of the Chesapeake & Ohio, has been appointed traffic manager, with headquarters at Richmond, Va., and **R. H. Vaughan,** general manager of the Blue Ridge Dispatch, has been appointed assistant general freight agent of the C. & O., with headquarters at Cincinnati, Ohio.

D. E. Sullivan, northwestern freight agent of the Baltimore & Ohio, at Minneapolis, Minn., has been appointed division freight agent at Chicago. **J. R. Lee,** commercial freight agent at Detroit, Mich., has been transferred to Toledo, Ohio, succeeding **E. C. Law,** who has been appointed division freight agent at Toledo. The position of commercial freight agent of the B. & O. at Detroit has been abolished.

Charles Emil Muller, who has been appointed assistant general freight agent of the Seaboard Air Line, with headquarters at Savannah, Ga., was born on June 17, 1884, at Baltimore, Md., and received a college education. After serving in various capacities with the Baltimore Steam Packet Company, he entered the service in the Seaboard Air Line, in March 1905, as soliciting freight agent, at Baltimore, Md. He later served as contracting freight agent, and since January 1, 1914 as general agent, at the same place, until his recent appointment as assistant general freight agent, of the same road, as above noted.

As a result of the director general's order to eliminate offline traffic offices, the Chicago & North Western announces a number of changes in its traffic department, effective June 10. The following assistant general freight agents, with headquarters at Chicago, have been appointed division freight and passenger agents: **M. J. Golden,** headquarters at Boone, Iowa; **E. W. Hoops,** headquarters at Chicago; **H. C. Cheyney,** headquarters at Green Bay, Wis. The following general agents at off-line offices have been appointed traffic agents, with headquarters at various points on the Chicago & North Western: **H. B. Loucks, Jr.,** Antigo, Wis.; **B. H. Bennett,** Eagle Grove, Iowa; **W. L. Stannard,** Fond du Lac, Wis.; **John Mellen,** Huron, S. D.; **C. A. Thurston,** Mason City, Iowa. The following general agents at on-line points have been appointed traffic agents: **W. B. Richards,** headquarters Council Bluffs, Iowa; **E. E. Benjamin,** headquarters Deadwood, S. D.; **W. R. McGinnis,** headquarters Norfolk, Neb.; **H. J. Wagen,** general agent, at Winona, has been appointed division freight and passenger agent, same headquarters.

Engineering and Rolling Stock

A. G. Smith has been appointed electrical engineer of the Boston & Albany, with headquarters at Boston, Mass., vice **C. W. Dodge,** resigned.

Charles S. Churchill, assistant to president of the Norfolk & Western, has been appointed, by the federal manager, chief of valuation, with office at Roanoke, Va.

J. A. Burnett, electrical engineer of the Grand Trunk, with office at Montreal, Que., has been appointed technical assistant with the British War Mission, Washington, D. C.

H. A. Cassil has been appointed engineer maintenance of way of the Pere Marquette, with duties as assistant in track maintenance and construction, and headquarters at Detroit, Mich.

L. J. Putnam, principal assistant engineer of the Chicago & North Western, was promoted on June 12 to chief engineer, succeeding **W. H. Finley,** who was recently elected president of the road.

F. J. Monahan, master mechanic, of the Memphis line of the Louisville & Nashville, has been appointed master mechanic of the Birmingham division, with headquarters at Boyles (Ala.) shops, and **T. H. Hogan** has been appointed

master mechanic of the Memphis line, with headquarters at Paris (Tenn.) shops, vice Mr. Monahan.

R. S. Parsons, assistant to president and general manager of the Erie, has been appointed chief engineer; **G. B. Owen,** chief engineer, has been appointed superintendent of maintenance; **H. Knight,** superintendent of maintenance, has been appointed assistant superintendent of maintenance; **R. H. Boykin,** assistant superintendent of maintenance, has been appointed assistant to superintendent of maintenance; all with headquarters at New York. The positions of general manager and assistant general manager have been abolished.

R. J. Middleton, valuation engineer of the Chicago, Milwaukee & St. Paul, at Chicago, has been promoted to assistant chief engineer of the Puget Sound lines, with headquarters at Seattle, Wash., succeeding **E. O. Reeder,** who has retired on account of ill health. **T. H. Strate,** valuation field engineer, with headquarters at Minneapolis, Minn., succeeds Mr. Middleton at Chicago, and **F. M. Sloan** takes the place of Mr. Strate at Minneapolis. **E. B. Crane** has been appointed assistant valuation engineer, with headquarters at Chicago. These changes were effective on June 15.

C. E. Lindsay, division engineer of the Mohawk division of the New York Central, with headquarters at Albany, N. Y., has accepted a position on the Board of Railroad Wages and Working Conditions under the United States Railroad Administration. **W. A. Murray,** division engineer of the Pennsylvania division, with office at Jersey Shore, Pa., succeeds Mr. Lindsay. **G. N. Edmondson,** division engineer of the Rochester division, with headquarters at Rochester, N. Y., has been transferred to Jersey Shore, succeeding Mr. Murray. **J. W. Stevens,** supervisor of tracks, with headquarters at Clearfield, Pa., has been appointed acting division engineer, Rochester division, succeeding Mr. Edmondson. **A. R. Jones,** assistant engineer in the office of engineer of track at New York, has been appointed supervisor at Clearfield, Pa., succeeding Mr. Stevens. **A. E. Johnson,** assistant engineer on the staff of division engineer of the Eastern division at New York, succeeds Mr. Jones.

Frank Carleton Huffman, resident engineer on construction, on the Chicago & North Western has been promoted to principal assistant engineer, succeeding **L. J. Putnam,** promoted. Mr. Huffman was born at Milford, Ind., on October 26, 1876. He was educated at Purdue University, graduating in 1905. He entered railway service with the Cleveland, Cincinnati, Chicago & St. Louis in June, 1903, as a rodman. During the summer months of the following two years he followed the same line of work with the same railroad. In the latter part of 1905 he went to the Pennsylvania Railroad at Pittsburgh, as assistant on the engineering corps. The following year he entered the employ of the Chicago & North Western as instrument man. Later he was appointed assistant engineer on construction. In 1908 he became assistant state engineer of South Dakota, at Pierre, S. D. The following year he returned to the North Western as locating engineer, with headquarters at Chicago. In 1912 he was appointed assistant resident engineer for the St. Louis, Peoria & North Western, a subsidiary of the Chicago & North Western. After the St. Louis line was completed he became resident engineer of construction, with headquarters at Chicago, having charge of grade reduction on the Southern Illinois division, the construction of the Kinnickinnic elevator at Milwaukee, the terminal elevator at South Chicago and the elevator at Council Bluffs, Iowa. Mr. Huffman was engaged in this work until his present promotion as noted above.

F. C. Huffman

Purchasing

E. W. Grice, assistant to president, of the Chesapeake & Ohio, has been appointed manager of purchases, stores and safety, with headquarters at Richmond, Va.

C. S. Goldborough, assistant to president of the Erie, at New York, has been appointed assistant to the federal manager with jurisdiction over the purchasing and stores department, and will perform other duties assigned to him.

H. P. McQuilkin has been appointed assistant general storekeeper of the Baltimore & Ohio, with office at Baltimore, Md., succeeding E. W. Thornley, who has been furloughed to accept service in the office of the Allegheny Regional Purchasing Committee.

Special

J. C. Tucker, assistant to vice-president in charge of operating of the Erie, at New York, has been appointed assistant to the federal manager with jurisdiction over the telegraph, employment, and safety departments, and will perform other duties assigned to him.

Percy R. Flanagan, general agent of the Chicago Great Western, at Spokane, Wash., has been assigned to duty as property protector, with headquarters at Chicago, effective June 1. The scope of his duties will include the protection of shippers' property in transit, as well as the property of the company.

Railway Officers in Government Service

W. C. Wishart has been appointed operating statistician in the office of the eastern regional director, New York city.

W. L. Barnes, assistant manager of the car service section of the Railroad Administration (Division of Transportation) at Washington, has been transferred to Chicago, where he will supervise refrigerator car and tank car service.

H. C. Woodbridge, assistant to general manager of the Buffalo, Rochester & Pittsburgh, has been appointed regional supervisor in the Fuel Conservation section, of the United States Railroad Administration, with headquarters at Philadelphia, Pa.

H. K. Mack has been appointed supervisor of coal traffic for the Railroad Administration in the southern Illinois coal fields, with headquarters at Herrin, Ill., effective June 12. Mr. Mack will have general charge of equipment and such other duties as may be assigned to him.

A. C. Everham, terminal engineer of the Union Pacific at Kansas City, Mo., has been assigned to work as a supervising constructing quartermaster, with the rank of major, in the quartermaster's corps of the National Army. **Major Everham** is now located at Washington, D. C.

H. T. Bentley, superintendent of motive power of the Chicago & North Western, who has been serving at Washington as mechanical assistant in the Division of Operation of the Railroad Administration, has resigned that place, and has returned to his office in Chicago. His duties at Washington will be taken over by Frank McManamy, manager of the locomotive section. The announcement says that Mr. Bentley's services have been very satisfactory, but ill-health has led him to ask to return to Chicago. As chairman of the committee on standards, he has had active charge of preparing standards for government engines and freight cars.

Obituary

E. H. Spalding, division engineer of the Duluth, Missabe & Northern, died at his home in Duluth on May 28 at the age of 67.

J. D. McNamara, passenger traffic manager of the Wabash, died on June 17, at St. Louis, Mo., from injuries received in an automobile collision.

C. J. Stewart, mechanical superintendent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., died recently at Twin Lakes, Conn., at the age of 51.